



Next Generation
Manufacturing Canada

Annual Report

2023-2024

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Glossary of Terms

| | |
|--------------------------|--|
| AI | Artificial Intelligence |
| AI4M | Artificial Intelligence for Manufacturing Cluster |
| CSA | Canadian Space Agency |
| ESDC | Employment and Social Development Canada |
| Future Ready | NGen's advanced manufacturing management and workforce development initiative funded by Employment and Social Development Canada |
| GIC | Canada's Global Innovation Clusters Program |
| GIC Phase I | Funding provided in NGen's first Contribution Agreement through the GIC program |
| GIC Phase II | Funding provided in NGen's second Contribution Agreement through the GIC program |
| ISED | Innovation, Science, and Economic Development Canada |
| M4M3 | Moonshot for Mining, Materials, and Manufacturing. A NGen program funded by the Canadian Space Agency and Global Innovation Clusters program |
| MFI | Martin Family Initiative in support of Indigenous Education |
| N3 | New. Now. Next. NGen's project showcase in February 2024. |
| NGen | Next Generation Manufacturing Canada, Canada's Global Innovation Cluster for Advanced Manufacturing |
| NGenCAN | NGen's national network of advanced manufacturing clusters |
| NGenConnect | NGen's AI-enabled advanced manufacturing capabilities search tool |
| NQS | Canada's National Quantum Strategy |
| NRC-IRAP | The National Research Council's Industrial Research Assistance Program |
| PCAIS | Canada's Pan Canadian AI Strategy |
| <i>Types of Funding:</i> | |
| Available | Amounts that have been allocated to NGen by public or private funding sources |
| Committed | Amounts that NGen has approved for investments in Technology Leadership projects, Strategic Ecosystem initiatives, or internal operations |
| Contracted | Amounts that have been allocated under contract to ultimate recipients for projects and ecosystem initiatives |
| Invested | Amounts that have been reimbursed to cover eligible project and ecosystem costs incurred by ultimate recipients |
| Eligible | Amounts reimbursed for eligible expenses as outlined in NGen's Contribution Agreements and Master Project Agreements with recipients. |



Next Generation Manufacturing

Next Generation Manufacturing Canada (NGen) is the industry-led, not-for-profit organization leading Canada's Global Innovation Cluster for Advanced Manufacturing.

NGen is dedicated to building world-leading advanced manufacturing capabilities in Canada, for the benefit of Canadians.

We are founded on the principle that digital transformation in advanced manufacturing will enrich the lives of Canadians, delivering better products and good jobs, improving environmental sustainability, supply chain resiliency, health and security, while generating the economic growth essential to a better future.

NGen creates new opportunities by enhancing and leveraging the capabilities of our country's manufacturers, engineering and technology companies, business services, researchers, academic institutions, innovation centres, business networks, and workforce. By facilitating collaboration, NGen aims to improve Canada's industrial innovation performance, connect and strengthen our advanced manufacturing ecosystem, and enhance the competitiveness and growth potential of this critical sector of the Canadian economy.

Catch up with what's happening in Canada's Global Innovation Cluster for Advanced Manufacturing at www.ngen.ca.

Contact Us:

McMaster Innovation Park - #301
175 Longwood Road S., Hamilton, ON, L8P 0A1
CANADA

Email: info@ngen.ca
Twitter/X: [@NGen_Canada](https://twitter.com/NGen_Canada)
LinkedIn: [nmgcanada.com](https://www.linkedin.com/company/nmgcanada.com)
Instagram: [@ngencanada](https://www.instagram.com/ngencanada)

Message from the Honourable François-Philippe Champagne



The Government of Canada is keeping Canada at the forefront of economic development by working to increase investment, enhance productivity and encourage the kind of game-changing innovation that will create good-paying and meaningful jobs for Canadians. We're working to empower more of our best entrepreneurs and innovators to put their ideas to work here in Canada.

The Global Innovation Clusters are built on a collaborative model designed to foster innovation and jointly address challenges to grow strong Canadian ecosystems. By bringing together companies of all sizes, academic institutions and not-for-profits to generate bold new ideas, the clusters are strengthening their ecosystems while positioning Canada for global markets.

The clusters have helped build successful and growing innovation ecosystems across the Canadian economy in five areas where Canada has a competitive advantage: digital technologies, plant-based protein, advanced manufacturing, artificial intelligence for supply chain and logistics, and ocean-based industries.

The government has continued to invest in the clusters to fuel Canada's innovation ecosystems, promote commercialization, support intellectual property creation and retention, and scale Canadian businesses, and it's been working. As of March 2024, the clusters have announced more than 540 projects worth over \$2.53 billion and involving 2,750 partners.

Because of their unique model and strong results, the Global Innovation Clusters were selected to help administer the Pan-Canadian Artificial Intelligence Strategy (PCAIS) and received \$125 million under the PCAIS's Commercialization pillar. To date, the clusters have announced 38 PCAIS projects that are worth over \$146 million and involve more than 158 partners. The clusters are helping scale-up Canadian AI firms to help secure and strengthen Canada's AI advantage.

The Advanced Manufacturing Cluster and the Digital Technology Cluster were also selected to help

administer the National Quantum Strategy and have received \$14 million as part of the commercialization pillar of the strategy.

Budget 2024 announced \$50 million for a new Homebuilding Technology and Innovation Fund being led by Canada's Advanced Manufacturing Cluster (Next Generation Manufacturing Canada [NGen]). This fund will support the scale-up, commercialization, and adoption of innovative housing technologies and materials, including those for modular and prefabricated homes.

In addition, the clusters are helping to build a skilled and diverse workforce by creating opportunities for women, racialized Canadians, Indigenous communities and other under-represented groups, and they are offering workshops and formalized training to develop diverse talent and meet sectoral labour force needs.

NGen is using digital transformation in advanced manufacturing to enrich the lives of Canadians and deliver improved products and good jobs while generating the economic growth essential for a better future. Over this past year, NGen has led initiatives that accelerated the commercialization of digital transformation in advanced manufacturing and promoted the adoption of clean-tech solutions for sustainable manufacturing, all while growing companies and creating job opportunities for Canadians.

I would like to extend a heartfelt thank you to NGen and everyone involved for their tireless efforts to strengthen Canadian innovation ecosystems, build a diverse and future-ready workforce, and expand our presence both at home and abroad.

The Honourable François-Philippe Champagne,
Minister of Innovation, Science and Industry

Message from our Chair Linda Hasenfratz



NGen continues to build a remarkable record of success as it pursues its goal of strengthening Canada's advanced manufacturing sector. Its role in accelerating the development and adoption of world-leading advanced manufacturing solutions is delivering important economic, environmental, and health and safety benefits for Canadians.

Measuring impacts like these is important. After all, how else can organizations - or innovation programs - determine the value they create and identify opportunities for improvement? NGen's results speak for themselves. At \$7 billion and counting, the economic value created by NGen-funded projects already exceeds 32x the amount that NGen has contributed to them. As a result, NGen is returning 4.8x the federal funding it has invested back to the government in tax revenue. That's an enviable return on investment for all Canadians!

There have been other meaningful impacts as well: 3,449 new jobs directly created by NGen-funded projects and another 2,558 job placements resulting from NGen's Future Ready program; 1,747 new IP assets and 55 new companies created by project partners; close to a million students learning about advanced manufacturing with 1,145 Indigenous elementary and secondary students enrolled in manufacturing entrepreneurship courses. With 75% of projects focusing on environmental sustainability and a quarter improving health care, all Canadians benefit from the investments NGen is making.

Our Board of Directors re-affirmed the direction that NGen is heading in our Five-Year Strategy published in 2023, building on the many successes the organization has realized to date. We have prioritized NGen's long-term financial sustainability, its focus on people, skills, connections, and collaboration, and support for Technology Leadership projects that can transform Canada's critical manufacturing sector and generate new jobs and revenue for industry and government alike. The Corporate Plan we approved for 2023-2024 set a path to achieving those objectives. NGen more than surpassed the targets we set for it last year.

For me and the other members of our Board, the initiative that really illustrates the unique value NGen

contributes to innovation in Canada was NGen's N3 project showcase. The event took place in early February 2024 and was an opportunity for NGen's project partners to display their technology solutions to an audience of more than 500 manufacturers, investors, and federal and provincial officials. They were truly leading-edge innovations.

But N3 was much more than a project showcase. It was an opportunity to hear from business leaders about the latest trends affecting Canada's advanced manufacturing sector, the strategic challenges and opportunities opening up for Canadian business, and the role that NGen can play in addressing them. It was also a fantastic networking event, bringing technology providers and manufacturers together with potential customers, innovation partners, suppliers, researchers, and even students. By all accounts, N3 was a great place to do business and build relationships. Many of the project partners who participated in the event have subsequently joined NGen at other industry exhibitions, including Hannover Messe this past April. There are very few funding organizations anywhere that stick with project partners to help them scale up and commercialize their results like NGen.

Going forward, our Board wants to amplify the success of N3 and NGen's many other initiatives. They make an important difference for manufacturers and tech companies of all sizes, for our next generation manufacturing workforce, and for Canadians generally. We have again set ambitious objectives and targets for NGen to achieve in our Corporate Plan for 2024-2025. And we are fully confident in NGen's ability to do just that.

I am delighted to serve as Chair of NGen along with Board colleagues who are all committed to the success of the organization and to the goal of building a more competitive and dynamic advanced manufacturing sector in Canada. I would like to thank my fellow Board members - volunteers all - for their service.

Linda Hasenfratz
Executive Chair & CEO
Linamar Corporation

Message from our CEO Jayson Myers



NGen continues to make a difference for advanced manufacturing in Canada - and for Canadians.

When we were established in 2018, we referred to ourselves as an experiment. We were committed then, as we are now, to building world-leading

advanced manufacturing capabilities for the benefit of Canadians. But our plans to do so had yet to be put to the test.

We have always based our strategy on connections, collaboration and good governance. NGen connects manufacturers, technology providers, researchers, advanced manufacturing clusters, and supporting organizations across Canada and increasingly around the world. We invest the funding we receive from the federal government, other public sources, and from industry in collaborative Technology Leadership projects that support the development, scale-up, and adoption of transformative technology solutions in Canadian manufacturing. We work with companies to help them manage and commercialize their Intellectual Property. Our Ecosystem Development initiatives offer strategic insights, promotional opportunities, and workforce development support to companies that are working together to showcase their capabilities, improve productivity, and grow through the adoption of digital technologies.

In short, NGen builds ecosystems. That's why our strategy has proved a success.

Now we are looking more than ever to the future. We are building a sustainable organization. We are investing in Technology Leadership projects that address critical challenges for Canadians and the world. They are focusing on strategic opportunities for Canada's advanced manufacturing sector in fields like circular manufacturing, electric vehicle and battery technology, biomanufacturing, advanced materials, automation, and robotics. We are introducing advanced manufacturing processes to accelerate Canadian homebuilding. Our Strategic Ecosystem initiatives are connecting advanced manufacturing companies and clusters across Canada and promoting education, workforce development, and attracting

more students and under-represented groups into careers in advanced manufacturing.

In 2025, NGen will lead Canada's industry delegation as partner country at Hannover Messe, the largest industrial technology show in the world. Taking advantage of the breadth of our network, the opportunity for companies with truly innovative industrial technologies to showcase their solutions on a global stage, and our wide-ranging promotional activities on behalf of Canada's advanced manufacturing sector, we are organizing an event in which Canada will truly own the podium at the Olympics of advanced manufacturing.

These are only some of the exciting initiatives that NGen has in store for the year ahead. I'm especially looking forward to working with the students who will be joining NGen in 2024. They are motivated not only by what we do, but by the opportunities we offer them to engage in initiatives that help solve some of the world's most pressing challenges.

I am extremely proud of NGen's team of highly qualified professionals and what they have accomplished over the past year. They bring industry experience and expertise, dedication, and enthusiasm to their jobs every day. It's a pleasure working with them - and a lot of fun. Our success is also a reflection of the leadership, guidance, and support of our Board of Directors, as well as close collaboration with our colleagues at Innovation, Science, and Economic Development Canada and our other funders. My thanks go to them all.

Jayson Myers
Chief Executive Officer of NGen

Technology Leadership: Delivering Innovation that Counts for Canadians

Delivering Real Economic Benefits for Every Region and Industry in Canada

Driving InnovationW

- \$292 million approved for investments in 210 projects across Canada leveraging \$444 million in additional innovation investments by industry and other funding partners.

Tangible Results to Date

- \$7.0 billion in new industry revenue
- 3,449 new jobs from projects and 2,558 additional job placements
- 55 new companies created
- 1,747 IP assets created
- 8,000+ students & employees being trained
- 4.8x estimated return on taxpayer investments from completed projects

Creating Collaborative Partnerships that Help Canadian Companies to Compete, Win and Grow

- 796 Project Partners
- 483 Industry Partners including 425 SMEs
- 313 Research Partners

Connecting Canada

- Project Partners in every Province
- 41% of Project Partners outside Ontario
- 39% of Projects in more than one Province

Making a Difference

- 75% of projects are improving environmental sustainability
- 60% are reducing GHG emissions



Ecosystem Initiatives: Supporting SMEs and Workers

Connections and Collaborations

Helping SMEs Grow

- 9,686 Members across Canada
- Ecosystem activities in every province and territory
- Hub for a Cross-Canada Network of 24 Advanced Manufacturing Clusters
- 175 IP Commercialization Plans
- 472 IP Licenses Granted to NGen Members
- 7 Strategic Opportunity roadmaps
- Webinars on Industry Trends, IP Management, Cybersecurity, AI Implementation

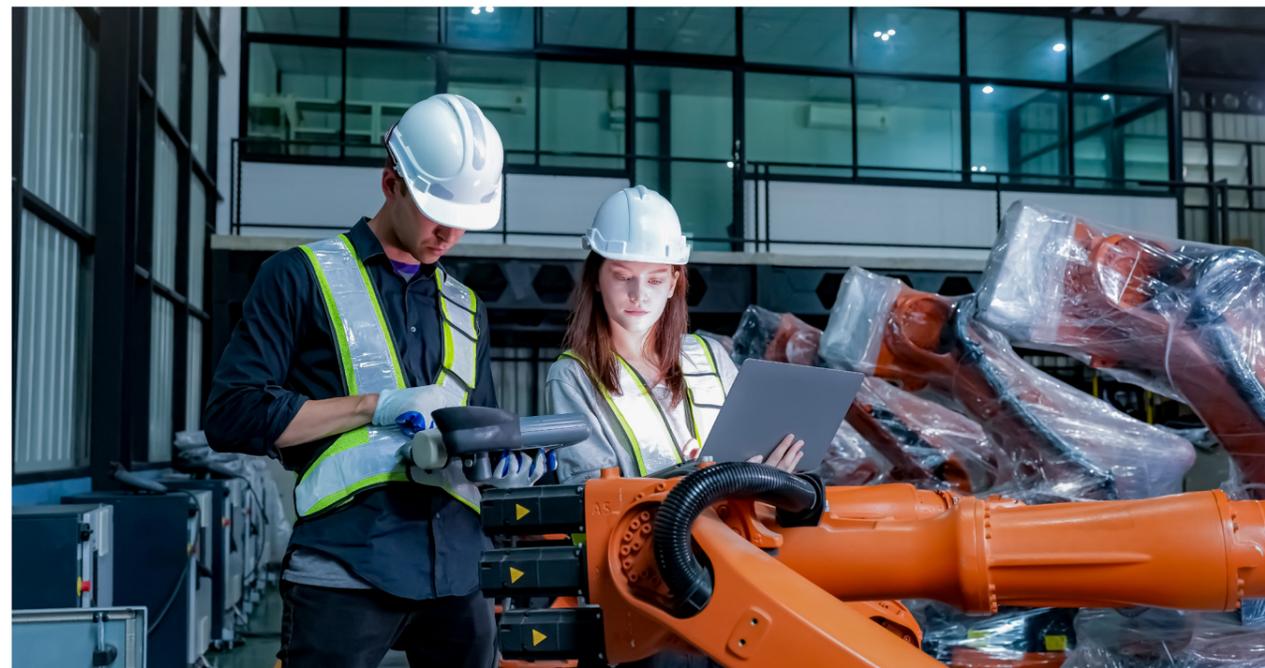
Building a Future Ready Workplace

- 986,000+ Students – 48% Female – Learning about Careers in Advanced Manufacturing
- 1,145 Indigenous Students Enrolled in Manufacturing Entrepreneurship and Financial Literacy Courses

- 418 Companies enrolled in NGen's Transformation Leadership Program
- 2,929 individuals enrolled in NGen-sponsored training programs
- 1,948 training credentials for workers from under-represented groups
- 2,558 new employees placed in full-time positions in manufacturing

Promoting Canadian Capabilities around the World

- World Manufacturing Forum Advisory Board
- Canada's Industry Leader at the Hannover Fair
- 54 International Trade and Investment Events
- World Top Ten AI Solution for UN Sustainable Development Goals
- Winner of Canadian and North American Media Awards



Our Commitment to the Future

Next Generation Manufacturing Canada is dedicated to building world-leading advanced manufacturing capabilities in Canada for the benefit of Canadians.

We aim to strengthen the competitiveness and growth potential of Canada's critical advanced manufacturing sector and deliver step-change improvements in greenhouse gas (GHG) emission reductions, environmental sustainability, health and safety, food and water security, and supply chain resilience for Canadians and the world.

NGen leads Canada's Global Innovation Cluster for Advanced Manufacturing. We help bridge the gap between research and the development of advanced manufacturing technologies on one hand and their industrial application, production scale-up, and commercialization on the other.

NGen builds ecosystems. We aim to enhance, connect, and leverage Canada's research, technology, and manufacturing strengths, workforce skills, and supporting innovation infrastructure. Our goal is to increase industry investment in innovation, accelerate the development, scale-up, and productive deployment of advanced technologies in Canadian manufacturing, grow innovative businesses in Canada, and help them commercialize their capabilities and Intellectual Property in global markets.

To that end, we work with industry and research partners across Canada to help develop and co-invest in collaborative Technology Leadership projects that integrate technologies in transformative manufacturing solutions that can be adopted at scale by manufacturers and commercialized in global value chains. We also undertake initiatives that strengthen Canada's advanced manufacturing ecosystem by:

- Identifying strategic opportunities for Canadian advanced manufacturing solutions.
- Building partnerships that help our members and project partners commercialize their Intellectual Property (IP).
- Making connections, facilitating innovation partnerships, and improving access to advanced manufacturing education and training programs, support services and funding, as well as to centres that enable technology scale-up and adoption.
- Amplifying initiatives and deepening collaboration across a national network of

advanced manufacturing clusters.

- Supporting the development and attraction of a highly skilled, diverse, and inclusive advanced manufacturing workforce in Canada, with special emphasis on attracting youth and under-represented groups into advanced manufacturing careers.
- Helping companies improve the management of advanced manufacturing processes, enhance supply chain resilience, and accelerate the implementation of net-zero emission facilities.
- Promoting Canada's advanced manufacturing capabilities across the country and around the world.



Strategic Objectives

NGen's aims to act as a:

- *National Force* by strengthening Canada's advanced manufacturing ecosystem in a way that creates a global advantage for Canada by leveraging and attracting industry investment, developing a global profile, and collaborating on projects at a national scale.
- *Driver of Growth* by accelerating the scale-up of small and medium-sized enterprises (SMEs) by fostering collaboration and integration in emerging value chains, to drive international opportunities, expand market share, and grow revenues.
- *Creator of Networks* by strengthening connections and collaborations among private, public, and academic organizations to drive impactful commercialization outcomes and develop domestic capacity.
- *Catalyst for Skills Development* by addressing skills gaps, acting as a magnet for global talent, collaboration, and skills and talent development, and fostering opportunities for equity-seeking groups to benefit from connections, to drive innovation and contribute to inclusive economic growth.

Our success is based on our ability to:

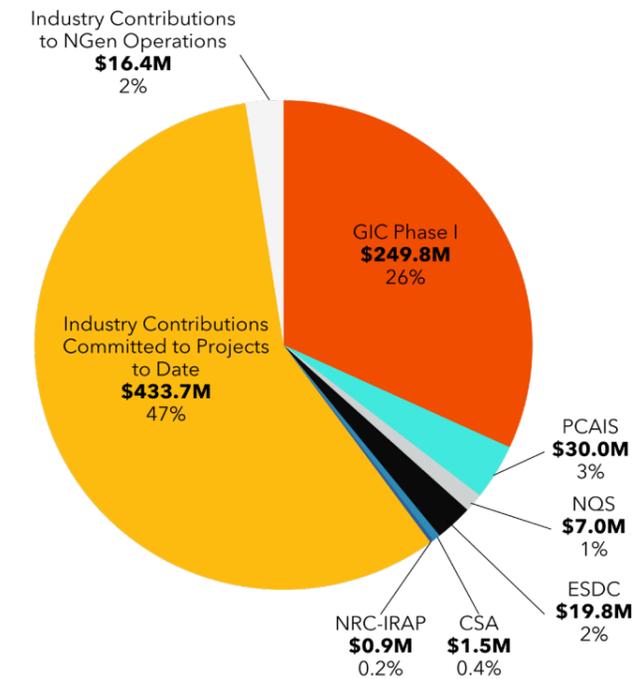
- Respond knowledgeably and rapidly to industry needs, identify strategic innovation opportunities, and work collaboratively to support the development, adoption, scale-up, & commercialization of leading-edge manufacturing solutions.
- Strengthen Canada's advanced manufacturing ecosystem by providing strategic leadership, promoting ecosystem capabilities, deepening connections and collaboration, and enhancing management and workforce skills.
- Excel as an organization in creating positive change by engaging expert, entrepreneurial, and motivated professionals pursuing their career objectives in a respectful, equitable, diverse, and inclusive work environment.
- Operate as a financially sustainable business outperforming expectations through compliant and responsible stewardship of investments in high-impact projects and ecosystem initiatives.



Our Business Model

NGen raises funds from a variety of public and private sources to invest in transformative Technology Leadership and Strategic Ecosystem initiatives.

NGen Funding & Industry Contributions



From our establishment in 2018 to the end of March 2024, NGen received:

- \$249.8 million under our first Contribution Agreement (Phase I) with the Global Innovation Cluster (GIC) program funded by Innovation, Science, and Economic Development Canada (ISED).
- \$177.2 million under our second Contribution Agreement (Phase II) with the Global Innovation Clusters program.
- \$30.0 million from ISED's Pan Canadian AI Strategy (PCAIS) to support applications of Artificial Intelligence in manufacturing.
- \$7.0 million from ISED's National Quantum Strategy (NQS) to support quantum applications for manufacturing and new manufacturing capabilities for quantum.

- \$19.8 million from Employment and Social Development Canada (ESDC) to support our Future Ready initiative.
- \$1.5 million from the Canadian Space Agency for our Moonshot for Mining, Materials, and Manufacturing projects.
- \$900,000 from NRC-IRAP to support our Additive Manufacturing Demonstration program.
- \$16.4 million in industry contributions to our operations.

We have leveraged an additional \$443.7 million in industry contributions for projects to date.

Building On Success

Our goal is to invest at least \$480 million in Technology Leadership Projects and Ecosystem Development Initiatives

Leveraging 1.7X that amount in industry contributions, to generate a cumulative total of \$1.3 billion in innovation investments between 2018 and 2028.

We aim to create or sustain 15,000 jobs and generate \$15 billion in GDP over that ten-year period.

2023-2024 marked the sixth year of NGen's operations. Our Strategic Plan describes how we intend to build on the strong track record of success that NGen has achieved since 2018 to meet even more ambitious investment, economic growth, and job creation targets by 2028 and beyond.

| Economic Impact | Result by March 31, 2024 | Cumulative Target March 31st, 2028 | Cumulative Target March 31st, 2033 |
|---|--------------------------|------------------------------------|------------------------------------|
| Industry Investment Match for Projects* | 1.7** | 1.7 | 1.7 |
| NGen Investments in Projects | \$291.8 million | \$480 million | \$1 billion |
| Total Innovation Investments in Projects | \$735.5 million | \$1.3 billion | \$3 billion |
| Revenue Generated by Projects | \$7.0 billion | \$15 billion | \$25 billion |
| Jobs Created by Projects | 3,449 | 15,000 | 25,000 |

* For Technology Leadership projects and Ecosystem initiatives where an industry match is required.

** Excluding COVID Rapid Response projects where no industry match was expected.

We are well on our way to meeting those objectives. NGen's Technology Leadership projects have stimulated industry investments in innovation, improved manufacturing productivity, generated new business opportunities for small and medium-sized enterprises (SMEs) in global supply chains, created new jobs and new business ventures, and led to improvements in environmental sustainability, emission reductions, supply chain resilience, food security, and health and safety.

By the end of March 2024, NGen had approved investments of \$291.8 million in 210 Technology Leadership projects with total innovation investments expected to reach \$735.5 million. Those projects involve 483 industry partners - 88% of which are SMEs - and 313 academic and other research partners. Completed projects have already generated \$7.0 billion in revenue, about 32x the amount that NGen invested in them. They led to the creation of 55 new companies and 1,747 new Intellectual Property rights, 205 of which are available for licensing to other NGen members - with 472 post-project licenses granted. Our completed projects have so far returned 4.8x

the amount of money we invested in them back to the federal government in the form of new tax revenue. They have stimulated industry investments in innovation, led to the creation of 3,449 new jobs, and delivered significant benefits in terms of productivity enhancement, environmental sustainability and greenhouse gas emission reductions, health care, supply chain resilience, and food security.

Over the past six years, up to the end of March 2024, NGen has also invested in a variety of Strategic Ecosystem initiatives that have:

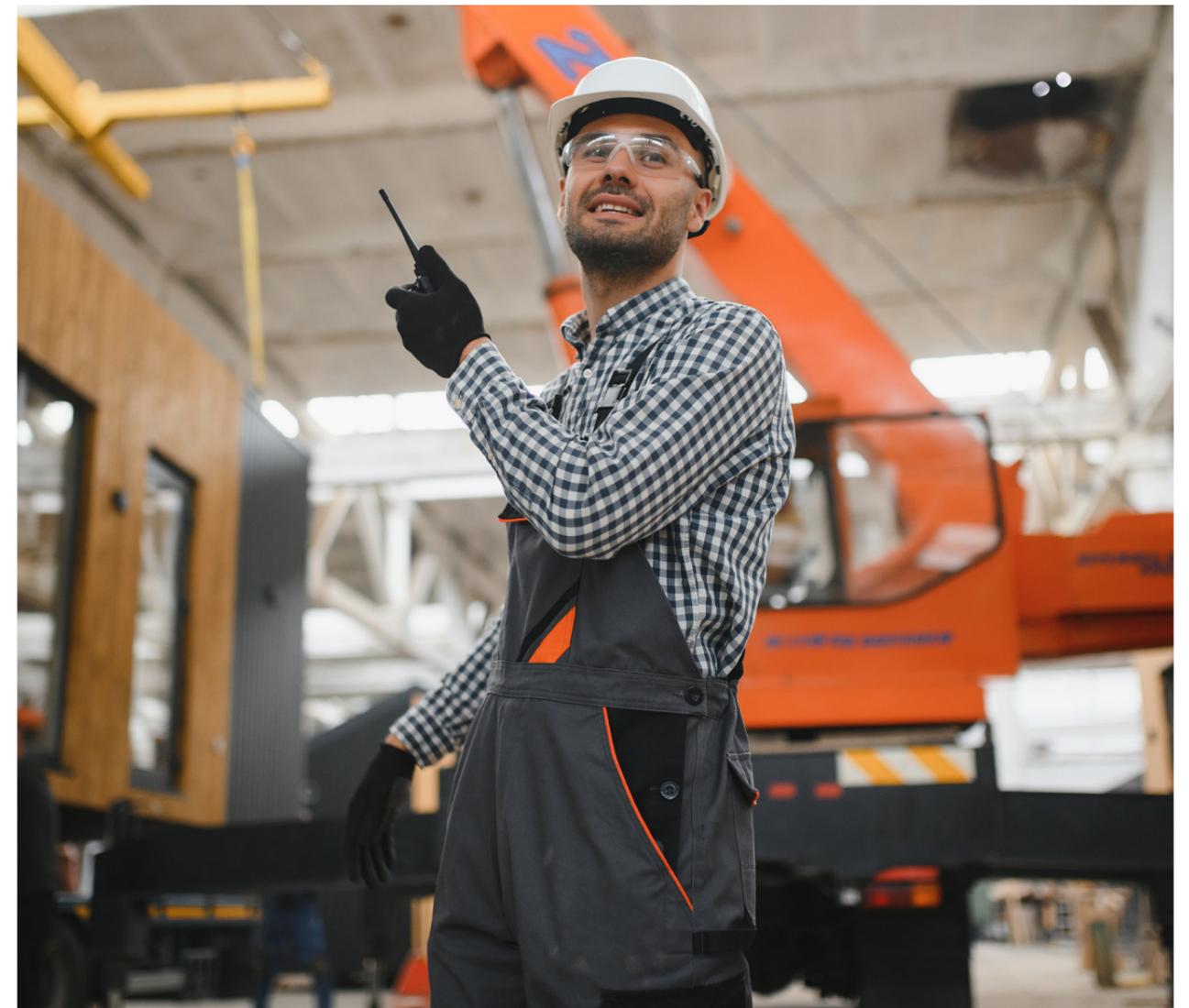
- Strengthened collaboration among 24 advanced manufacturing clusters across Canada.
- Provided transformation management and skills development support to over 3,300 manufacturing workers across the country.
- Provided manufacturing entrepreneurship and financial literacy education to 567 Indigenous students in 17 elementary and secondary schools in northern Canada.

- Connected 4,053 advanced manufacturing companies in our online search tool.
- Supported 114 Canadian companies showcasing their capabilities in international trade events. Engaged over 986,000 young Canadians investigating future careers in advanced manufacturing.

NGen's achievements reflect many of the strategic advantages we have developed as an organization over the past six years. As an industry-led initiative, NGen focuses on the innovation and business challenges facing Canada's advanced manufacturing sector and the opportunities that industry identifies for investment and business development. NGen's extensive network of manufacturers, technology providers, and support organizations allows us to mobilize and engage partners from across Canada's advanced manufacturing ecosystem quickly and easily.

Our emphasis on collaboration offers individual companies and ecosystem partners innovation and business opportunities they would not be able to realize on their own, whether those involve participating in the development of integrated technology solutions for manufacturing, taking advantage of shared industry knowledge and best practices, or amplifying and taking advantage of the promotional and support services provided by NGen and other ecosystem partners.

In addition, NGen's focus on funding later-stage technology pilots, scale-up, and implementation in manufacturing fills a critical funding gap in Canada's innovation support system. NGen provides a unique non-dilutive funding service that complements financial support for innovation from other public funding agencies and private sector investors in Canada. Moreover, the governance and operating processes we have developed allow us to administer our funding in a secure, impartial, efficient, and responsible way.



Objectives for 2023-2024

NGen set five priority objectives in our Corporate Plan for 2023-2024

- Complete and help commercialize all projects that received funding from the Global Innovation Cluster (GIC) program up to the end of 2023 (Phase I projects).
 - Launch projects to be supported by new GIC funding (Phase II projects), the Pan Canadian AI Strategy (PCAIS), and the National Quantum Strategy (NQS).
 - Support Ecosystem initiatives to identify strategic business opportunities for Canadian companies, connect Canada's advanced manufacturing ecosystem, promote Canadian capabilities across Canada and internationally, attract more young people and under-represented groups into advanced manufacturing, and support advanced management and workforce skills development.
 - Deliver NGen's Future Ready and Additive Manufacturing Demonstration programs funded by Employment and Social Development Canada (ESDC) and the National Research Council's Industrial Research Assistance Program (NRC-IRAP) respectively.
 - Secure additional revenue to support NGen's long-term financial sustainability.
- These priorities were reflected in the targets that our Board of Directors set for NGen to achieve over the course of the year. We surpassed 95% of these goals by the end of March 2024.

| Priority | Targets for 2023-2024 | Results by March 31st 2024 |
|--|--|---|
| Leadership | <ul style="list-style-type: none"> NPS of 70 among 75% of active project partners NPS of 50 among 50% of program registrants | <ul style="list-style-type: none"> NPS of 68 among 81% of project partners NPS of 59 for 52% of program participants |
| Project Realization | <ul style="list-style-type: none"> 100% of all Phase I projects complete \$218 million of Phase I project funding disbursed \$18 million in PCAIS project funding approved \$135 M in total new funding from PCAIS, NQS, and Phase II in programs secured | <ul style="list-style-type: none"> 100% Phase I projects complete \$218 M fully disbursed Phase I projects and Hannover 2024 program \$19.1 M allocated to PCAIS projects \$153.7 secured for new project funding |
| Capacity Building | <ul style="list-style-type: none"> 100 use cases showcased on NGen's solution centre 4,000 companies on collaboration platform 300 companies in workforce & management development programs 700 new employee placements NGen supporting 20 companies enter international markets | <ul style="list-style-type: none"> 184 project use cases profiled 4,053 companies on platform 793 companies participating 2,558 placements 33 companies exhibiting with NGen |
| Financial Management & Compliance | <ul style="list-style-type: none"> Begin to implement plan for financial sustainability 90% employee engagement rating Financial statements signed off by external auditor No compliance violations | <ul style="list-style-type: none"> Strategy developed and \$6 million raised 82% engagement rating Clean audit sign-off No violations |
| Impact | <ul style="list-style-type: none"> 4 strategic roadmaps commissioned 7,000 members 24 clusters in advanced manufacturing cluster network 1,000 companies in NGen collaboration events 80 companies hosted at Hannover Messe 2023 50,000 students engaged in CareersoftheFuture.ca and Indigenous education | <ul style="list-style-type: none"> 5 commissioned - 9,686 members - 24 clusters - 1,153 participants - 94 companies - 476,283 students engaged in 2023/24 |

* A Net Promoter Score (NPS) is a method of gauging customer satisfaction. We surveyed NGen project partners and program participants to ask on a scale of 1 to 10 how likely they are to recommend our services to others. The NPS is calculated by subtracting the number of detractors (those scoring 6 or below) from the number of promoters (those scoring 9 and 10).

Completion of Phase I Projects

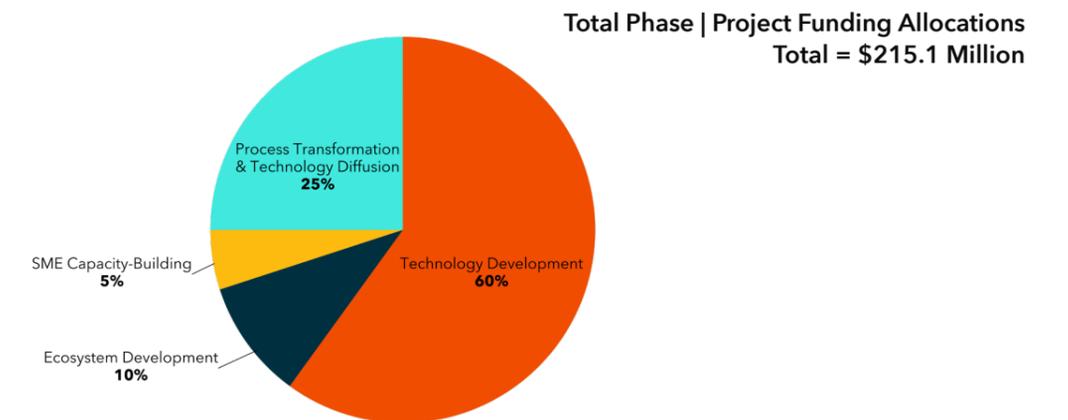
NGen supports the development, successful completion, and subsequent commercialization of industry-led Technology Leadership projects that integrate Canadian research, technology, and manufacturing capabilities to develop innovative advanced manufacturing solutions that can be implemented at scale by industry and commercialized widely in global supply chains. All Technology Leadership projects are required to meet strategic eligibility criteria established by NGen's Board of Directors. They must be:

- Transformative** - building world-leading advanced manufacturing capabilities in Canada or strategic capabilities that enhance the competitiveness of Canada's advanced manufacturing ecosystem.
- Applied** - supporting the development, scale-up, and adoption of advanced manufacturing solutions with significant near-term commercial potential.
- Collaborative** - enabling capabilities that no individual company or organization can achieve on its own.
- Enduring** - contributing know-how and

resources that strengthen Canada's advanced manufacturing ecosystem.

The first phase of Global Innovation Cluster funding enabled NGen to invest \$215.1 million in:

- High Potential Technology Development** projects that developed and scaled new manufacturing processes with the potential to give Canadian manufacturers a significant competitive advantage in world markets.
- Ground-Breaking Process Transformation and Technology Diffusion** projects that involved the adoption of advanced technologies to transform existing manufacturing processes in critical sectors of Canadian manufacturing.
- Industry-led Ecosystem Development** projects that enhanced education and training, research and testbed infrastructure, and scale-up supports for Canada's advanced manufacturing ecosystem, particularly for SMEs.
- SME Capacity Building** projects that supported smaller-scale pilots, technology and commercialization feasibility studies, and cluster-building activities.



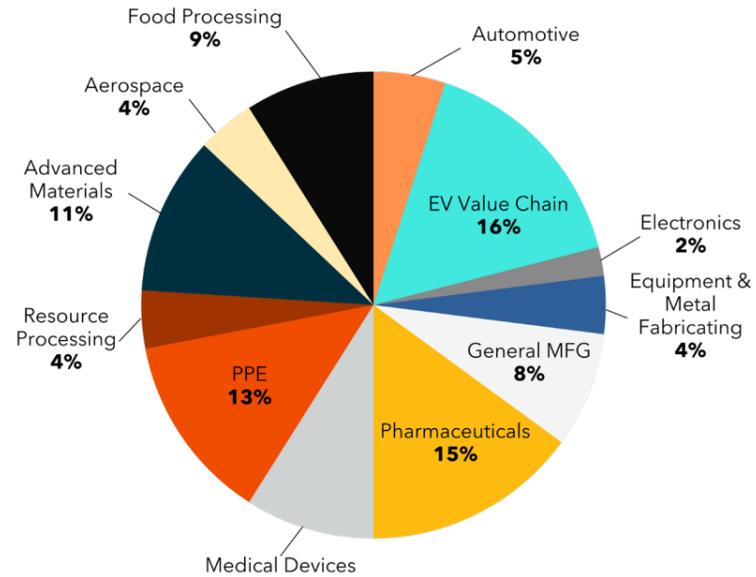
We focused on projects that:

- Filled critical supply chain gaps in equipping Canada's health care system with test kits, medical devices, disinfection systems, and personal protective equipment to protect Canadians against the COVID pandemic.
- Strengthened the competitiveness of Canada's Electric Vehicle value chain.
- Developed and implemented new advanced

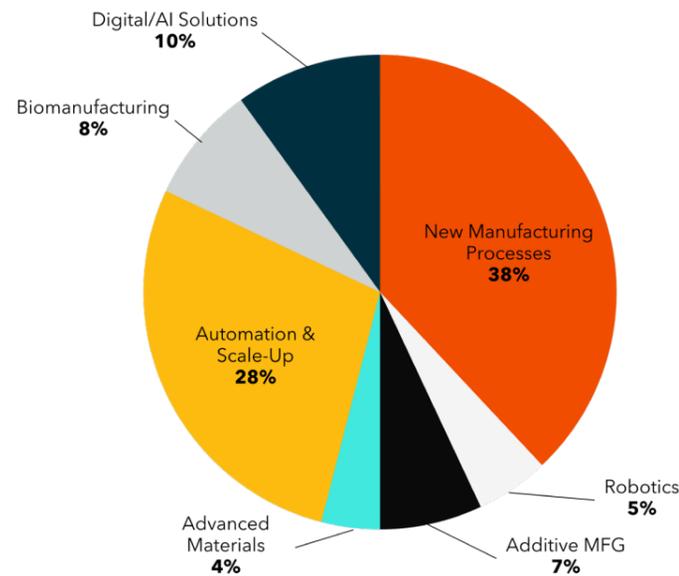
manufacturing solutions in fields like advanced materials and additive manufacturing, automation and robotics, biomanufacturing, digitization and Artificial Intelligence, and other multi-technology manufacturing processes.

- Equipped new R&D laboratories and testbeds dedicated to helping SMEs prove out and scale their technologies in environmental and life sciences biomanufacturing and electric battery production.

NGen Funding by Sector of Primary Application



NGen Funding by Type of Solution



By the end of March 2024, all projects funded by Phase I of the Global Innovation Clusters program had been completed with all eligible project expense claims closed out. The projects involved 681 project partners, including 370 industry partners, 328 (89%) of which were small and medium sized enterprises (SMEs) with fewer than

500 employees, 311 research partners, as well as over 300 college and university students. There were 52 projects with project partners collaborating in more than one province. NGen's GIC Phase I project impacts are summarized below.

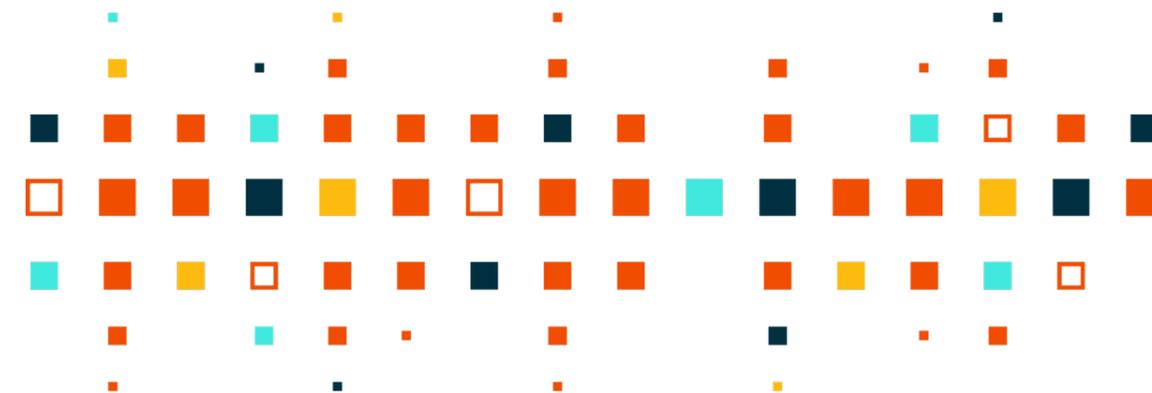
Phase I Completed Projects Impact Summary

| Economic impacts (End of March 2024) | |
|---|-----------------|
| Innovation investment by industry | \$310.3 million |
| Industry contribution per dollar of NGen investment | 1.7* |
| Revenue generated from sales and IP licensing fees | \$7.0 billion |
| Sales per dollar of NGen investment | 32x |
| Federal tax return per dollar of NGen investment | 4.8x |
| New companies created | 55 |
| Direct jobs created | 3,449 |
| Direct and indirect jobs expected to be created by 2028 | 32,749 |

* Excluding COVID-related projects for which no industry match was expected.

Ecosystem Impacts

| | |
|---|-----|
| Percent of projects with positive environmental impact | 75% |
| Percent of projects resulting in GHG emission reductions | 60% |
| Percent of projects contributing to supply chain resilience | 52% |
| Percent of projects contributing to improved health care | 28% |



New Project Funding

In NGen’s Corporate Plan for 2023-2024, we undertook to launch funding for Technology Leadership projects under Phase II of the Global Innovation Cluster (GIC) program, the Pan Canadian AI Strategy (PCAIS), and National Quantum Strategy (NQS), focusing specifically on:

- Innovation challenges in the Electric Vehicle value chain.
- Scale up and demonstration of de-carbonization and circular solutions in manufacturing.
- Other leading-edge advanced manufacturing solutions in fields like aerospace, electronics, advanced manufacturing systems, medical devices, biomanufacturing, robotics and customized automation.
- Commercialization of AI solutions in manufacturing.
- Quantum applications in manufacturing and manufacturing for Quantum.

In 2023 NGen was awarded an additional \$1.5 million from the Canadian Space Agency, of which \$1.35 million was made available to fund projects that will develop innovative technologies for in-situ resource utilization on the moon which can then be repurposed and commercialized in mining, mineral processing, and advanced manufacturing applications on earth. These projects are part of our Moonshot for Mining, Minerals, and Manufacturing (M4M3) initiative. NGen is matching CSA funding from our Phase II GIC advanced manufacturing project stream.

By the end of March 2024, NGen had approved investments amounting to \$76.7 million in 45 projects under our new Technology Leadership project streams. Our investments will leverage another \$133.4 in industry contributions, taking total project investment to \$210.1 million. So far these projects involve 113 industry partners, 97 (86%) SMEs, and two research partners. Twenty-three of these projects were contracted and underway by the end of NGen’s 2023-2024 financial year.

| Project Stream | Number of Approved Projects | Number of Contracted Projects | Industry Partners | SME Partners | Research Partners | NGen Funding | Total Estimated Investment |
|------------------------|-----------------------------|-------------------------------|-------------------|--------------|-------------------|----------------|----------------------------|
| GIC Phase II | 22 | 17 | 59 | 50 | 2 | \$49.5 million | \$137.8 million |
| Advanced Manufacturing | 17 | 17 | 48 | 41 | 2 | \$36.4 million | \$99.0 million |
| EV Value Chain | 5 | - | 11 | 9 | - | \$13.0 million | \$38.8 million |
| PCAIS | 12 | 12 | 31 | 24 | - | \$19.1 million | \$55.1 million |
| Quantum | 4 | 1 | 9 | 9 | - | \$5.6 million | \$12.0 million |
| CSA (M4M3) | 7 | - | 14 | 14 | - | \$2.5 million | \$5.1 million |
| Total | 45 | 30 | 113 | 97 | 2 | \$76.7 million | \$210.1 million |

Strengthening Canada’s Advanced Manufacturing Ecosystem

NGen builds ecosystems. All our initiatives, including the collaborative industry-led projects in which we co-invest, are intended to contribute to and strengthen Canada’s advanced manufacturing ecosystem.

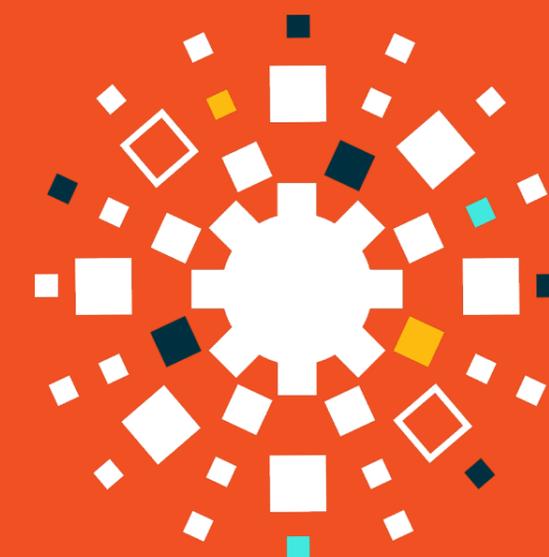
NGen has a unique role to play in this regard by focusing the attention of ecosystem partners on advanced manufacturing, identifying and supporting industry-led innovation priorities, and building connections and collaboration across an extensive network of manufacturers, technology companies, academic and research institutions, advanced manufacturing clusters, other support organizations, and individual industry experts that are all part of NGen’s membership.

A systemic ecosystem approach is vital to solving the technical and manufacturing problems facing Canadian industry and tackling many of the bigger economic, social, and environmental challenges confronting Canadians, now and in the future. Advanced manufacturing is powering many of the solutions that we need. But it takes collaboration and a supportive and well-connected ecosystem to achieve success, and to ensure that the opportunities and value of innovation are captured in Canada.

Collaboration is at the heart of NGen’s strategy. World-leading capabilities in advanced manufacturing cannot be built one company or one organization at a time. The pace of technological change, business disruption, and emerging market opportunities is simply too fast for any one entity to take on all the risks or command all the resources needed to succeed on its own. NGen is also uniquely positioned to work on behalf of its members by building collaborative approaches to public sector programming, funding, and policy-making that supersede organizational and jurisdictional boundaries.

Unique manufacturing solutions depend on integrating knowledge, tools, and capabilities that employ a variety of advanced digital, materials, and production technologies and management techniques. The deployment, scale-up, and commercialization of those solutions in turn depend on maximizing the potential of shared Intellectual Property. Support from innovation networks, business services, public sector, and investment infrastructures are critical for commercial success. Business knowledge and best practices shared across organizations, sectors, and regions are instrumental in enhancing the leadership and management capabilities required to develop and execute new business strategies effectively. Everyone has a stake in developing and gaining access to a highly qualified workforce.

NGen funding provides an important incentive for building and de-risking collaboration and for strengthening Canada’s advanced manufacturing ecosystem. All NGen Technology Leadership projects are expected to make a significant contribution in the form of intellectual property, education and workforce development opportunities, business knowledge, and/or tools and testbeds that can be shared with other NGen members.



Direct Support for Ecosystem Development Initiatives 2023-2024

| Initiative | Funding Invested | Industry & Other Contributions | Funding Eligible Costs |
|---|-----------------------|--------------------------------|------------------------|
| Technology Leadership Projects | \$11.3 million | \$7.2 million | \$18.5 million |
| Future Ready | \$14.6 million | \$3.2 million | \$16.1 million |
| Additive Manufacturing Demonstration Program | \$0.4 million | \$0.1 million | \$0.4 million |
| Strategic Ecosystem Initiatives | \$4.5 million | \$0.3 million | \$4.5 million |
| Total | \$30.8 million | \$10.8 million | \$39.5 million |

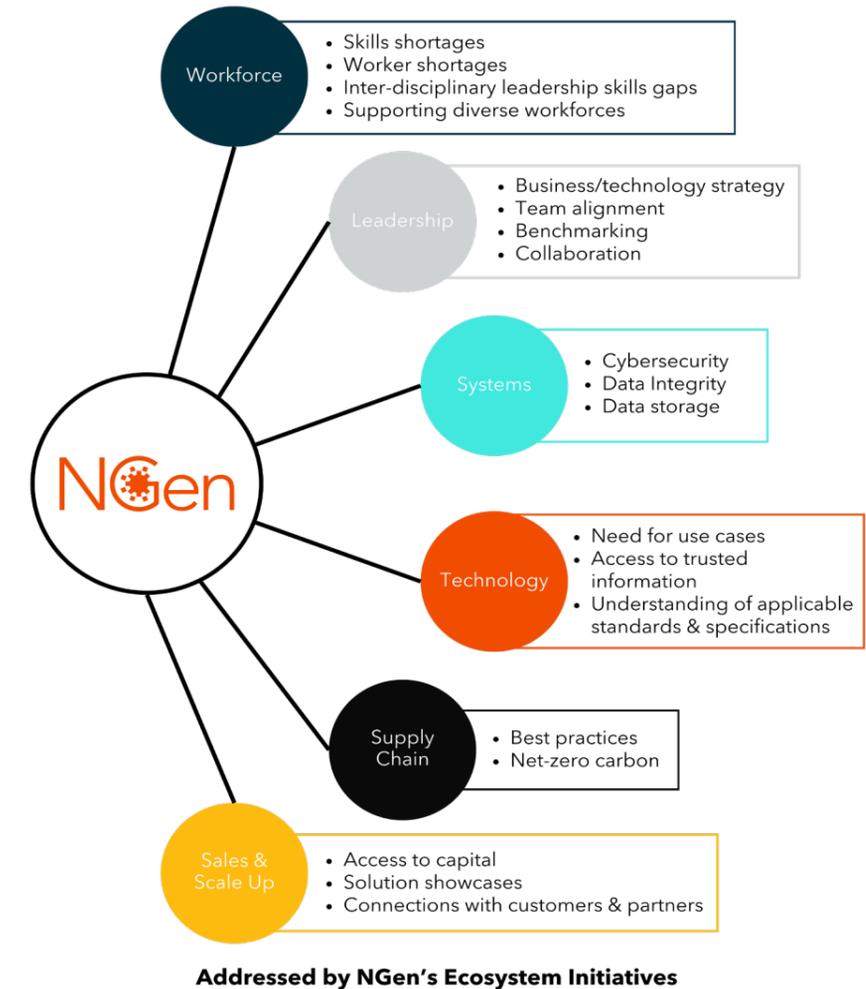
Over the past year we have invested in three types of initiatives that provide direct support for ecosystem development:

1. Eight of NGen's Technology Leadership projects focus on building ecosystem capacity in the form of shared R&D facilities, new testbeds, and training initiatives for start-ups and SMEs in biomanufacturing and Electric Vehicle value chain. Those projects accounted for \$18.5 million in funded eligible costs in 2023-2024.
2. NGen's Future Ready skills and employment development initiative and our Additive Manufacturing Industrial Demonstration Program together accounted for \$16.5 million in funded eligible costs.
3. Strategic Ecosystem initiatives that promote Canada's advanced manufacturing capabilities, build connections and collaboration, attract more young people into advanced manufacturing, develop a more highly skilled, equitable, diverse, and inclusive advanced manufacturing workforce, and

help manufacturers manage business and technology transformation. We invested an additional \$4.5 million in support of Strategic Ecosystem initiatives in 2023-2024, contributing:

- \$0.8 million to host our N3 project showcase in February 2024.
- \$2.0 million to organize Canada's industry presence at Hannover Messe in April 2024.
- \$1.7 million for other ecosystem initiatives including development of our NGen Connect platform, expansion of our network of advanced manufacturing clusters, continuation of our Careers of the Future initiative that aims to attract young people into careers in advanced manufacturing, as well as our Indigenous education programming.

Challenges Impacting Advanced Manufacturing in Canada



A) Strategic Insights

National Force

Driver of Growth

NGen provides an informed global perspective on the challenges and opportunities facing Canada's advanced manufacturing sector. In our Corporate Plan for 2023-2024, we undertook to provide advanced manufacturing insights for our members and the ecosystem at large by commissioning and publishing studies of strategic innovation and commercialization opportunities, organizing webinars and podcasts on technology trends and NGen projects, and participating in advanced manufacturing conferences across Canada. Reports and podcasts are posted on www.ngen.ca.

Throughout the year we:

- Commissioned a competitiveness update for Canada's advanced manufacturing sector and six strategic opportunity roadmaps related to decarbonization priorities of large industrial

emitters, sector-wide GHG emission reporting, Canada's hydrogen ecosystem, small modular reactors, Canada life sciences innovation ecosystem, and electric battery value chains. We also published a report on potential technology and economic development opportunities arising from lunar in-situ mining which formed the basis of our Moonshot for Mining, Minerals, and Manufacturing initiative co-funded with the Canadian Space Agency.

- Published seven reports on changing skills requirements in Canada's advanced manufacturing sector as part of our Future Ready initiative. (See below).
- Organized five webinars with panels of industry experts discussing the subjects of smart manufacturing, biomanufacturing, AI applications in manufacturing, and circular manufacturing. (We co-hosted one of the two webinars on circular manufacturing with It's OWL, an advanced manufacturing cluster

based in OstWestfalenLippe Germany).

- Hosted ten podcasts with project partners to explore emerging trends in their fields of expertise.
- Reported via social media and NGen's Insights webpage on six international trade shows at Hannover Messe, Formnext, The Greener Manufacturing Show, AM Berlin, Automatica/

B) Commercialization

National Force

Driver of Growth

Creator of Networks

In NGen's 2023-2024 Corporate Plan we committed to work with project partners, and NGen members generally, to facilitate the successful commercialization of their advanced manufacturing solutions within Canada, as well as in international markets and supply chains.

We planned to:

- Conduct a commercialization needs assessment of our project partners.
- Conduct ecosystem gap analyses and innovation needs assessments of larger manufacturers operating or looking to invest in Canada and facilitate introductions to our project partners.
- Convene a conference for Phase I project partners and other ecosystem partners to showcase project outcomes and technology use cases.
- Launch an online Solutions Centre to promote the capabilities of project partners and other NGen members to showcase solutions and advanced manufacturing use cases.
- Facilitate industry participation and promote Canadian capabilities at major international trade shows.
- Increase and promote Intellectual Property assets available for licensing to NGen members.

All industry partners in completed projects were surveyed at the end of 2023 with a view to identifying how NGen could assist them in commercializing the solutions developed in their projects. They told us that NGen could play a valuable role primarily in facilitating:

World of Photonics, and Nanotech Japan.

- Participated as speakers in 135 industry conferences and events across the country to provide insights on transformative trends in manufacturing and how NGen can help companies take advantage of emerging business opportunities.
- Access to post-project funding for scale-up and commercialization.
- Development of market or updated IP commercialization plans.
- Introductions to potential customers, suppliers, and/or innovation partners in Canada and internationally.
- Access to public procurement.
- Opportunities to showcase and promote solutions in Canada and internationally.
- Connections to supporting commercialization and export development services.
- Access to skilled personnel.

Over the past year we commissioned strategic opportunity and supplier development roadmaps for battery manufacturing, small modular reactors, hydrogen infrastructure, industrial decarbonization and emission reductions, life sciences companies, and lunar in-situ resource utilization.

NGen's N3 Summit, which took place on February 8th, 2024 showcased over 60 projects for an audience of more than 500 manufacturers, technology companies, investors, and public officials.

NGen developed an AI-enabled search engine, NGenConnect, which will allow users to quickly and easily identify advanced manufacturing capabilities and technology use cases from across Canada.

We facilitated the participation of 33 exhibitors and 63 other delegates in major trade events in 2023-2024, including:

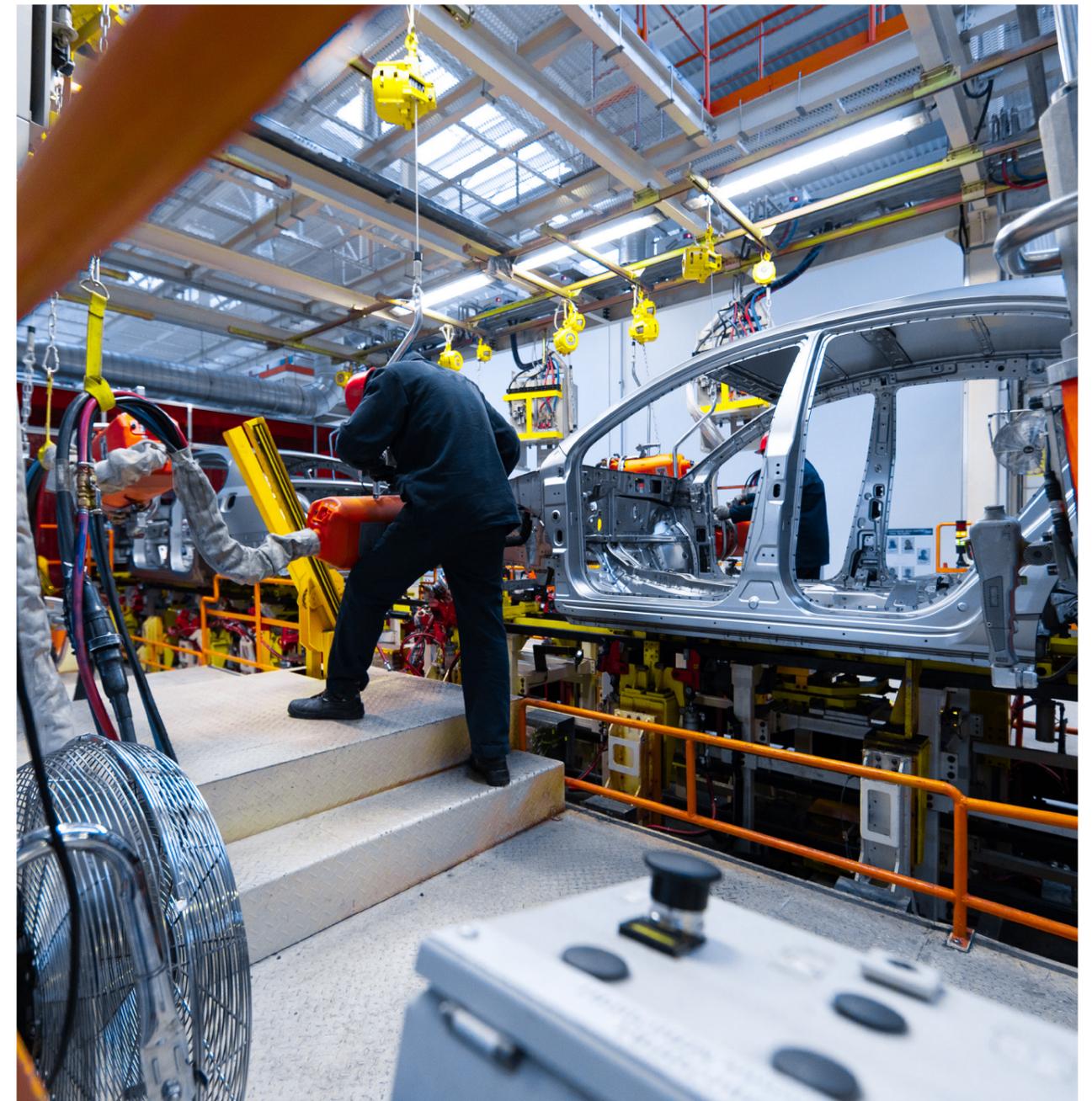
- 17 exhibitors and 41 delegates at Hannover Messe 2023, the world's largest advanced manufacturing trade show.
- 6 exhibitors and 14 delegates at Formnext, the world's largest trade event for additive manufacturing.

- 10 exhibitors at the Canadian Manufacturing Trade Show.
- 8 delegates at the UK Electric Vehicle show.

NGen also organized a cross-country roadshow in the fall of 2023 to promote Canada's presence at Hannover Messe in 2024 and 2025 and recruit exhibitors and delegates to the fair. Partnering with Deutsche Messe, ISED, Global Affairs, and the German-Canadian Chamber of Commerce, we made presentations in Halifax, Montreal, Kitchener ON, Calgary, and Vancouver. Over 350 participants attended the roadshow events which were instrumental in recruiting 82 Canadian exhibitors and 30 visitors to Hannover Messe in April 2024.

We promoted Canada's advanced manufacturing capabilities in other international advanced manufacturing events as well, including Automatica/World of Photonics, Rapid and AM Berlin in the field of additive manufacturing, the Greener Manufacturing Show, Nanotech Japan, and the Asia Pacific Foundation's Canada in Asia Conference on Climate Solutions.

By the end of March 2024, 205 IP rights were available in NGen's IP Registry for licensing to NGen members, 89 more than twelve months earlier. In addition, 472 post-project licenses had been granted, an increase of 302 since the end of March last year.



Commercialization Highlights

N3 SUMMIT



FORMNEXT



COLLISION



UK ELECTRIC VEHICLE SHOW



HANNOVER 2023



C) Connections and Collaborations

National Force

Driver of Growth

Creator of Networks

NGen creates opportunities for innovation partnerships, value chain development, and business growth through connections that we build with and among our members. NGen does not charge a fee for membership because we want to engage as many participants in our activities as possible across Canada's advanced manufacturing ecosystem. However, we do ask members to register in our database. They are then eligible to apply for and participate in Technology Leadership projects, receive news and updates from NGen, and publish information about their solutions and advanced manufacturing capabilities on our digital collaboration platform.

In our Corporate Plan for 2023-2024:

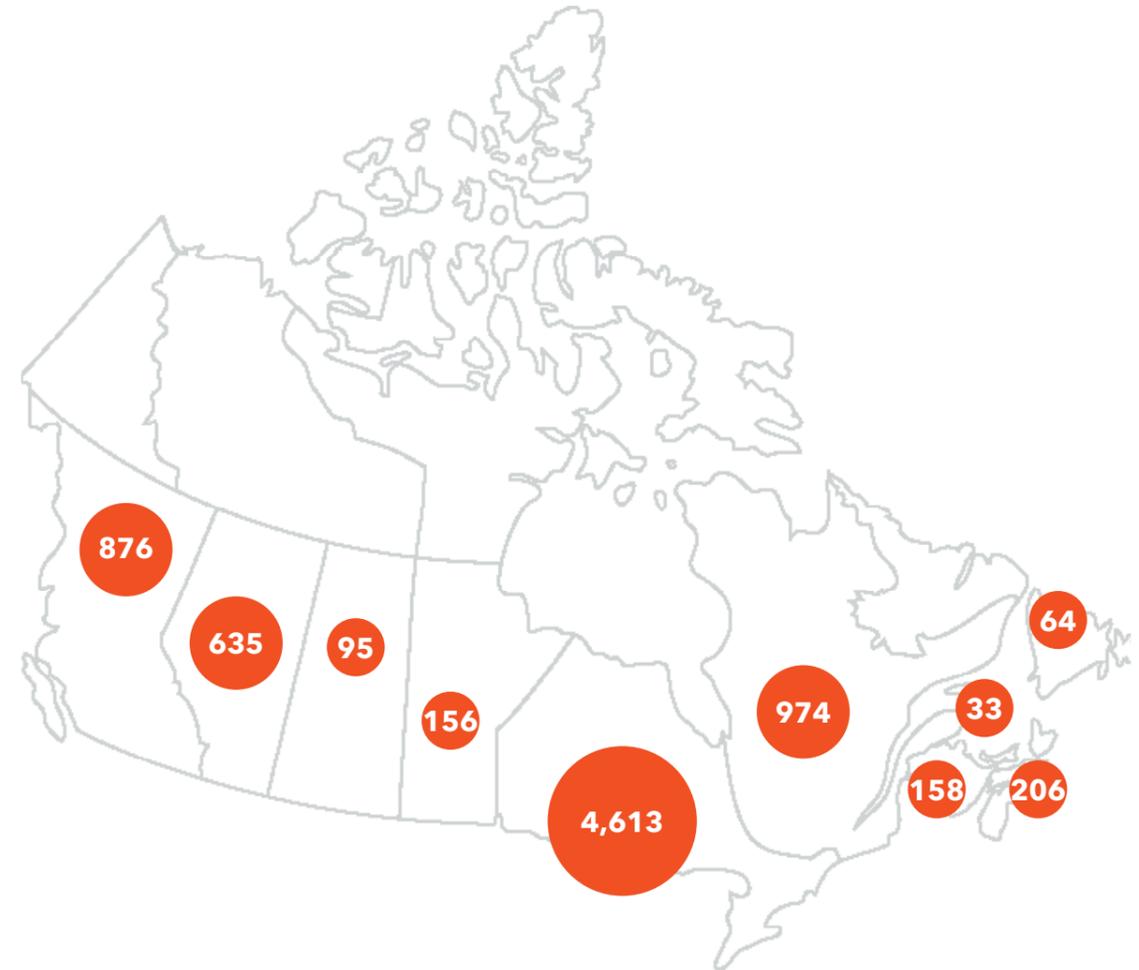
- NGen aimed to increase our membership to 7,000. At the end of March 2024, our membership had grown to 9,686, including 3,544 corporate members and 6,376 individual experts and researchers. This represents a 4,296 increase since March of last year. Our corporate membership is composed of manufacturers, technology providers, academic and research institutions, and support services – many companies identify in more than one of these categories. NGen now counts members in every province and one territory across Canada, along with 253 members based outside the country.
- We said that we would host three collaboration events to inform members about eligibility requirements following our calls for Technology Leadership project proposals and help them identify potential project partners. Over the course of the year, NGen organized 12 collaboration workshops related to advanced manufacturing, the EV value chain, and our Moonshot for Mining, Minerals, and Manufacturing project streams. The workshops, which were presented in both official languages, involved 32 ecosystem partner organizations and more than 1,150 participants.
- We planned to launch an AI-enabled matchmaking platform with the capabilities of 4,000 members and other ecosystem partners searchable on the site. A prototype version was unveiled at Hannover Messe in April 2023 and a final test version of NGenConnect was

developed by the end of March 2024 and demonstrated at Hannover Messe 2024. At the end of March there were 4,053 companies listed on the platform. The platform will be made available on our website in 2024.

- NGen also undertook to expand and deepen our engagement with ecosystem partners, including with other Global Innovation Clusters. NGen now has formal working agreements with 53 ecosystem partners across Canada facilitating joint efforts to support Technology Leadership projects, promote and commercialize member capabilities, attract young people and equity-seeking groups into advanced manufacturing, and support skills and workforce development. Over the past year we partnered with the Digital Cluster to launch and co-fund project investments under the National Quantum Strategy. We partnered with Scale AI to promote employment opportunities in Canada's advanced manufacturing and AI sectors to graduate students in the Boston area. We also joined with our other Cluster partners in participating in events like Collision, All In, and Hannover Messe to promote our projects and the Global Innovation Cluster program.
- We said that we would assist other ecosystem initiatives aimed at accelerating the development, adoption, and commercialization of advanced manufacturing solutions originating in Canada. In 2023-2024, NGen shared information about our governance policies and operating procedures, chaired working groups, or referred projects for funding in collaboration with seven different innovation networks. We:
 - ◊ Assisted in the formation of Canada's Immuno-Engineering and Biomanufacturing Hub (CIEBH), the Initiative for Sustainable Aviation Technology (INSAT), Canada's Semiconductor Cluster (FABrIC), and Palette Skills' Upskill Canada program.
 - ◊ Co-chaired the working supplier working group of the Supply Chain Advancement Network in Health (SCANH) community of practice based at the University of Windsor. The initiative focuses on expediting reliable supply and building resilient supply chains for critical health care products in the event of future emergency situations such as another pandemic.

- ◊ Co-chaired the program committee for the Canadian Robotics Council.
- ◊ Referred projects for funding to the Canadian Food Innovation Network, a national ecosystem initiative that we had previously helped get off the ground.
- NGen also committed to expanding our network of advanced manufacturing clusters

NGen Membership Highlights
Members Across Canada



Corporate Membership Categories

| | |
|---------------------------------|-----|
| Manufacturing | 41% |
| Technology Providers | 62% |
| Academic & Research Institution | 7% |
| Support Services | 8% |
| International Members | 3% |



D) Advanced Manufacturing Cluster Network

National Force

Creator of Networks

Driver of Growth

Catalyst for Skills Development

As an important part of NGen's Strategic Ecosystem initiatives aimed at strengthening the competitiveness and growth potential of Canada's advanced manufacturing sector, NGen has established a Cluster Accelerator program with funding allocated to support the activities of, and strengthen collaboration among, advanced manufacturing clusters across Canada. Clusters supported by the program are members of NGenCAN, a cross-Canada advanced manufacturing network that aims to accelerate the development, adoption, and commercialization of advanced technologies in manufacturing, along with the development of the workforce skills and management capabilities required for successful innovation and business growth.

Around the world clusters have been demonstrated to accelerate innovation, improve economic competitiveness, and drive business growth. NGen has been designated by the OECD as a model advanced manufacturing cluster at the heart of a network of clusters – a true Supercluster!

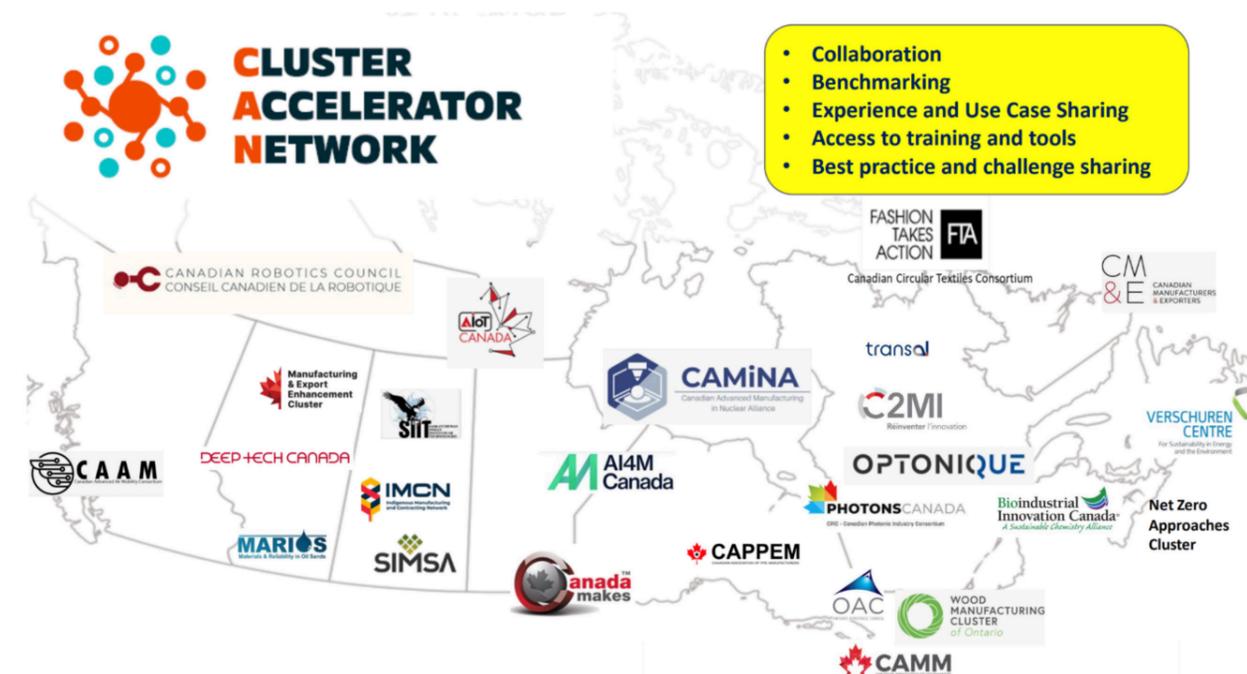
The NGenCAN network is intended to supercharge

Canada's advanced manufacturing ecosystem by:

- Connecting advanced manufacturing clusters and their members across Canada and internationally.
- Amplifying the voice, expanding the reach, and enhancing the value that individual advanced manufacturing clusters provide their members.
- Promoting and showcasing cluster activities.
- Leveraging cluster capabilities through a collaborative network of shared best practices, industry insights, tools, and services.
- Promoting Canada's advanced manufacturing ecosystem as a magnet for international talent and investment attraction.

In our Corporate Plan for 2023-2024, NGen undertook to:

- Expand NGenCAN membership. At the end of March 2024, our network consisted of 24 advanced manufacturing clusters.
- Establish an NGenCAN action plan for the year. The plan was approved at an in-person networking conference of NGenCAN members in April 2023.



We also committed to:

- Launch a cluster accelerator program for funding cluster development. The program was launched at the end of March 2024 and will provide financial support for advanced manufacturing clusters to undertake:
 - ◊ Start-up Projects that support the development of new advanced manufacturing clusters with a shared goal of driving innovation and business growth within a collaborative framework.
 - ◊ Innovation Projects that promote the development and/or adoption of advanced manufacturing technologies by cluster members.
 - ◊ Commercialization Projects that scope out strategic opportunities for supplier and business development, support commercialization and export readiness of cluster members, and/or facilitate participation in international export or investment missions.
 - ◊ Sustainability Projects that assist cluster members in improving environmental management, reducing GHG emissions, and/or strengthening domestic supply chain resilience.
 - ◊ Workforce and Management Enhancement Projects that enhance the innovation management capabilities of cluster members, attract young people and equity-seeking groups into careers in advanced manufacturing, develop new skills training end employee placement initiatives, enhance diversity and inclusion in Canada's advanced manufacturing workforce, and/or position the cluster as a magnet for

international talent attraction.

- ◊ Network Projects that support collaborative initiatives among two or more clusters in pursuit of innovation, commercialization, sustainability, or workforce and management enhancement objectives.
- Facilitate the participation of clusters and cluster members in key conferences and trade shows in Canada and internationally. Over the past year NGen has supported 15 clusters participating in NGen's N3 project showcase and talent attraction events, as well as in the Canadian Robotics Council conference, Canadian Semiconductor Symposium, Canadian Manufacturing Trade Show, Hannover Messe, the UK EV and Battery Show, and Nanotech Japan.
- Build online connections and business opportunities for cluster members. NGen's AI-enabled capability search platform contains descriptions and use cases for over 1,000 cluster members. Over the past year NGenCan also generated a variety of cross-cluster collaborations. SIMSA worked with the Canadian Advanced Manufacturers in Nuclear Alliance (CAMiNA) and MARIOS to develop equipment for the nuclear and oil sands industries. NGen, Deep Tech, Canada Makes, AI4M, Photons Canada, Canadian Robotics Council, and CME-NL organized joint participation in international trade shows, including Hannover Messe. The Saskatchewan Indian Institute of Technologies partnered with IMCN and Fashion Takes Action to develop a program focusing on sustainable and circular manufacturing of textiles and apparel. And the Verschuren Centre provided lab facilities for new materials development from Net Zero Approaches.

E) Attracting Talent

National Force

Catalyst for Skills Development

With over a quarter of Canada's advanced manufacturing workforce likely to retire over the next ten years, it is more important than ever to attract more young people, equity-deserving groups, and recent immigrants into careers in the sector.

In 2023-2024, NGen undertook to:

- Partner with other organizations to expand and enrich our Careers of the Future initiative aimed at educating students about the career

opportunities open to them in advanced manufacturing. We worked with the Student Commission of Canada to develop social media materials about advanced manufacturing that were shared with students and employers across the country as part of Canada's Take Our Kids to Work initiative. We also partnered with Youth Culture to recruit more young ambassadors for advanced manufacturing and refresh our Careers of the Future website. By the end of March 2024 these initiatives had enabled NGen to engage over 476,000 students, 1,672 educators, and 1,898 families across Canada.

- Renew our support for the development and delivery of the Martin Family Initiative’s manufacturing entrepreneurship and financial literacy curriculum for Indigenous students. A total of 1,269 Indigenous students, including 824 elementary students and 443 secondary students and adult learners, enrolled in these courses in 2023-2024. NGen’s support provided course material to 343 schools across northern Canada with programs now in place in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, and Nunavut.
- Develop partnerships with organizations dedicated to supporting equity-seeking groups in advanced manufacturing technologies. As part of our Future Ready initiative supported by funding from Employment and Social Development Canada (ESDC), NGen partnered with the Canadian Skills Training and

Employment Coalition (CSTEC) and College Technology Access Centres across Canada to train, certify, and place 2,929 individuals (including 1,948 from equity-deserving groups) in new jobs in manufacturing.

- Explore opportunities to attract international talent into Canada’s advanced manufacturing sector. In February 2024 NGen co-hosted Talent Goes North in partnership with Canada’s consulate in Boston and the Canadian student association at the Massachusetts Institute of Technology. The event brought 21 NGen members together with 165 graduate science, engineering, and business students from MIT, Harvard, Boston University, and Northeastern University to inform the students about advanced manufacturing job opportunities in Canada. Fourteen placements had been reported by the end of March 2024 as a result of the event.

Talent Attraction Highlights



Take Our Kids to Work Day



Martin Family Initiative: Advanced Manufacturing and Entrepreneurship Program for Indigenous Students

“When you incorporate Indigenous knowledge and examples of Indigenous success stories, students actually see that their way of learning – their view of the world – is valid and very transferable in today’s world.”

Lorne Belmore
Principal

“The most useful learning I gained from this course is learning how to see an idea from beginning to end, even when you aren’t as confident in yourself. It truly does pay off in the end.”

Student

“Indigenous people belong in business, they belong in leadership, and whatever else they want to do in life.”

Reid Skelton-Morven
City Councillor, Business Owner and Course Alumnus

F) Future Ready: Transformation Leadership and Workforce Development

National Force

Catalyst for Skills Development

Thanks to funding from Employment and Social Development Canada (ESDC), NGen was able to fulfill our objectives in 2023-2024 of gaining a more in-depth understanding of skills requirements in advanced manufacturing, supporting customized skills training for manufacturers and their employees, and enhancing advanced manufacturing management practices.

ESDC support allowed NGen to launch our Future Ready program, in which we:

- Provided skills training and management development opportunities in both official languages to executives and employees via our Transformation Leadership Program (TLP)

and AmpUp open-source digital training platform. TLP aims to enhance strategic leadership and management skill sets on the part of manufacturing executives, providing them with a methodology and tools to identify strategic priorities for their business, develop a balanced roadmap for business transformation, and put in place plans to address skills gaps. The program helped manufacturers address organizational challenges like onboarding and training talent, improving throughput, profitability, and operating efficiencies, understanding sustainability and processes leading to industrial carbonization, and managing different cultures and values to build more flexible and sustainable businesses. Informed by the findings of TLP, manufacturers were offered financial support of up to \$8,000 per company for employee training to meet their skill requirements.



Between April 2023 and March 2024, 418 companies enrolled in NGen's Transformation Leadership Program while 72 companies enrolled in courses available on NGen's AmpUp platform. Throughout the year, TLP allowed participating companies to set up training programs for just over 700 employees with support from \$865,000 in training grants offered by NGen.

- Partnered with the Canadian Skills Training and Employment Coalition to place new workers in manufacturing jobs. Our goal was to provide training support to 1,100 individuals including 550 from equity-deserving groups. By the end of March 2024, 2,929 individuals including 1,948 or two-thirds from equity-deserving groups, enrolled in Future Ready training programs, supported by \$3.447 million in wage subsidies from NGen. Participants received training certifications, with 2,558 (87%) placed in full-time jobs at the end of the program.
- Partnered with Tech Access Canada and newcomer support agencies to offer recent immigrants to Canada an opportunity to demonstrate their expertise in skilled trades along with resources to help them enter the Canadian job market. NGen hosted events at colleges in Red Deer AB, Regina SK, Hamilton ON, Whitby ON, Orleans ON, Summerside PEI, and Alberton PEI which offered skills and job qualification assessments to over 100 newcomers to Canada. NGen provided free transportation, childcare, PPE, and accommodation to remove barriers to participation. Events focused on skill sets pertinent to welders, machinists, and electricians. Participants received a certificate along with video footage of their work to use to demonstrate their

capabilities in future job interviews.

- Commissioned studies from the Auto Parts Manufacturers Association (APMA), Biotalent Canada, Canadian Marine Industries and Shipbuilders Association (CMISA), Downsview Aerospace Innovation and Research group (DAIR), Food Producer Skills Canada (FPSC), and the Saskatchewan Industrial and Mining Suppliers Association (SIMSA) that assessed the current and future competencies of the Canadian manufacturing workforce based on transferable skills in their sector. NGen also collaborated with CSTEC to publish a series of industry reports investigating the impact of transformations in Canadian manufacturing. The reports, published on NGen's website, include:
 - ◊ [Decarbonization and its Impact on Canada's Manufacturing Workforce.](#)
 - ◊ [Digitizing Canada's Advanced Manufacturing Sector: reshaping Jobs and Skills.](#)
 - ◊ [Technological Innovation and Workforce Diversity in the Advanced Manufacturing Sector.](#)
 - ◊ [Artificial Intelligence in Manufacturing: The Evolution of Technology and Jobs in the Sector.](#)
 - ◊ [Advanced Manufacturing Skills Catalogue.](#)
 - ◊ [Best Practices for Newcomers Labour Market Intervention Programmes: A Case Study.](#)
 - ◊ [An Assessment of the Changing Skills Needs of the Canadian Manufacturing Workforce.](#)

- Developed online tools to help manufacturers assess their core skills and build personalized plans for training and reskilling their employees. The tools can be accessed at FutureReady.ca and include:
 - ◊ A Skills Building Zone where users can access a catalogue of on-demand training and tools for manufacturers and workers.

- ◊ Skills for Success Assessments that allow manufacturing workers to assess their core skills and provide personalized recommendations for skills development.

Future Ready Highlights



"The one word that summarizes the program for me is: "Invaluable". The program helped us to understand several important aspects of our own company. Difficult to put a value on that."

PRATISH GAWAND CEO, Andra Bio

"The NGen Future Ready Program was a great format and venue for our leadership team to uncover gaps and prioritize strategic initiatives. The program workshops were high-value, information packed sessions which prompted some necessary healthy debate among our leadership team. The format of the program was a good balance of learning and self evaluation time which didn't require extensive out of office commitments. Because of this program our leadership team is more aligned than ever, have clear priorities for where to focus next, and provide a roadmap to upskill our team to get there. I would welcome the opportunity to participate in a program like this every year as it is the perfect kick off to strategic planning."

JEFF BISHOP Co-founder, Dormie Workshop

"We are greatly appreciative of the opportunity to take part in the Future Ready Program.

As a company that has grown from 5 employees to 35 employees over the past 18 months, many of our manufacturing processes have been evolving and adapting at a rapid rate as well.

The knowledge imparted as well as the ability to have some of our employees do professional development to expand upon their capabilities was a great benefit to our company as a whole.

Thank you NGen!"

Mindy Castle
Executive Assistant, Bushel Plus Ltd.

Impact

- 418** Manufacturers enrolled in NGen's Transformation Leadership Program
- 5,557** Employers accessing Future Ready tools
- 2,929** Individuals enrolled in training programs
- 1,948** Individuals from under-represented groups
- 2,929** Individuals receiving training credentials
- 2,558** Works placed in full-time employment

G) Metal and Engineered Plastics Additive Manufacturing Industrial Demonstration Program

NGen continued our work with the National Research Council's Industrial Research Assistance Program (NRC-IRAP) in 2023-2024 to deliver our Additive Manufacturing Industrial Demonstration Program. NGen received \$405,000 in funding from IRAP to accelerate the application of additive manufacturing processes, especially on the part of SMEs, through support for feasibility studies, testing, and demonstration projects.

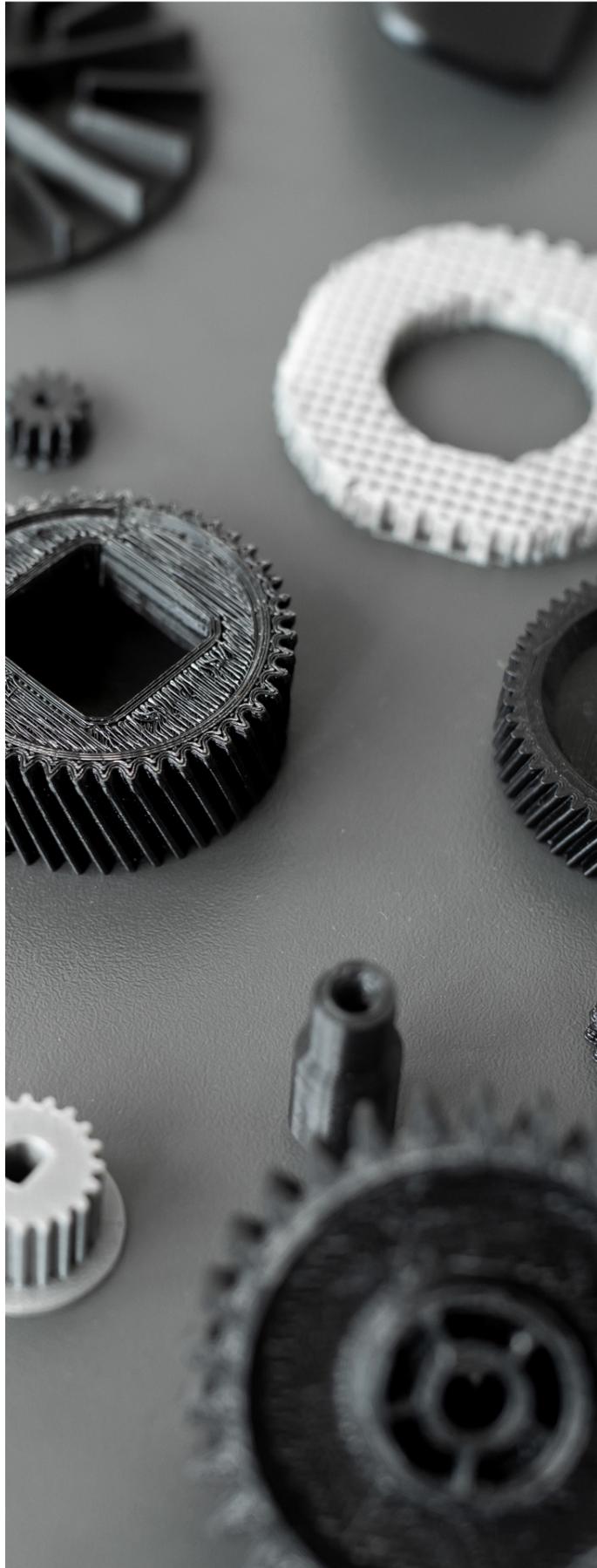
The objectives of the program were to reinforce and diversify Canada's additive manufacturing supply chain, increase the awareness and confidence of smaller manufacturers applying additive manufacturing and new materials for specific tooling and production applications, and provide business development opportunities for materials suppliers and additive services providers.

NGen partnered with NRC-IRAP's industry technology advisors across Canada to identify and engage SMEs interested in undertaking a feasibility study of metal or engineering-grade plastic additive manufacturing for their R&D or production needs. We also identified and engaged larger manufacturers and their suppliers in projects to help create sustainable additive manufacturing supply chains in Canada's manufacturing sector, particularly in aerospace and automotive. Suppliers of raw materials and services companies were selected and contracted to carry out additive manufacturing and post-processing of test coupons or small parts as required to support selected projects. NGen also supported approved projects by providing feedback and coordination between companies and contracted service providers to ensure project success.

Our target for 2023-2024 was to support 70 projects involving SMEs and at least 11 larger firms in additive manufacturing projects. By the end of March 2024, we had supported 78 projects, enabling the participation of 79 SMEs, 11 larger companies, and 32 different service providers from across Canada. Participating organizations are listed in Annex 3 of this report.

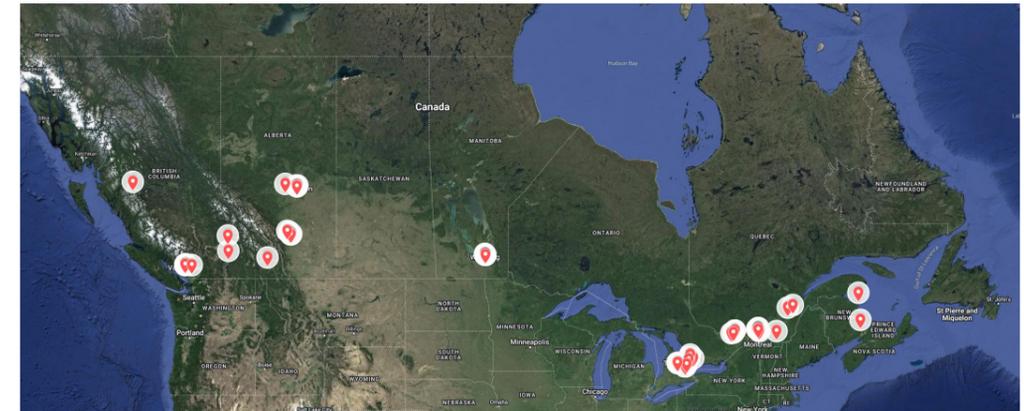
NGen's AM Demo Program has acted as a catalyst allowing Canadian companies to develop new products, novel manufacturing processes, and grow their business in new markets. Additive manufacturing would not have been considered and partnerships with AM suppliers would not have occurred without the program opening the door, making connections, and de-risking first steps.

In March 2024, NGen secured an additional \$400,000 from NRC-IRAP to continue the Additive Manufacturing Demonstration Program in 2024-2025.



Additive Manufacturing Demonstration Program Highlights

Projects Across Canada



With the Support of NRC-IRAP and Technology Partners across Canada

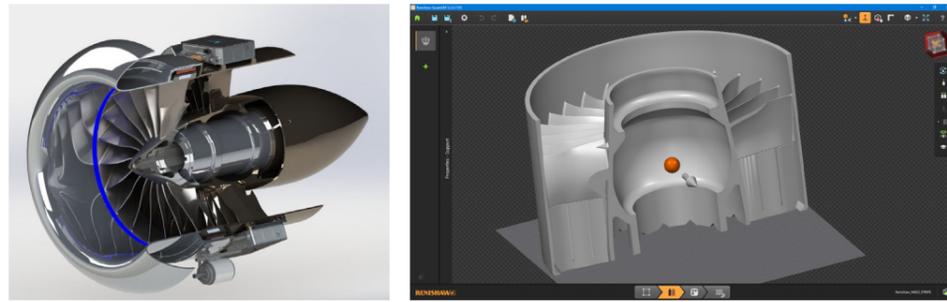


Dominis & Apollo Clad: Near-Shape Propellers | NURO & Custom Prototype: Neurological Helmets

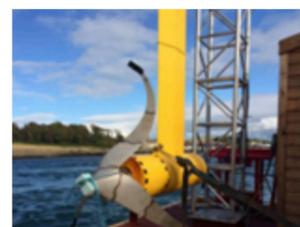
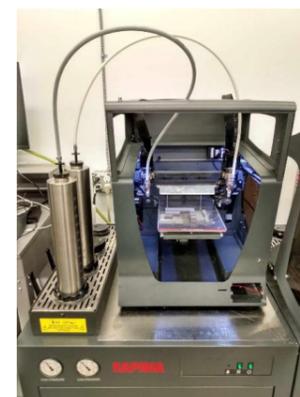


Additive Manufacturing Demonstration Program Highlights

Duxion & Tronos: Complex Blading in Electric Test Engines



Rapidia & Suncor: High-Wear Cutting Tools



Biome Renewable & Nova Scotia Community College Tidal Turbine

H) Promoting NGen and Canada's Advanced Manufacturing Ecosystem

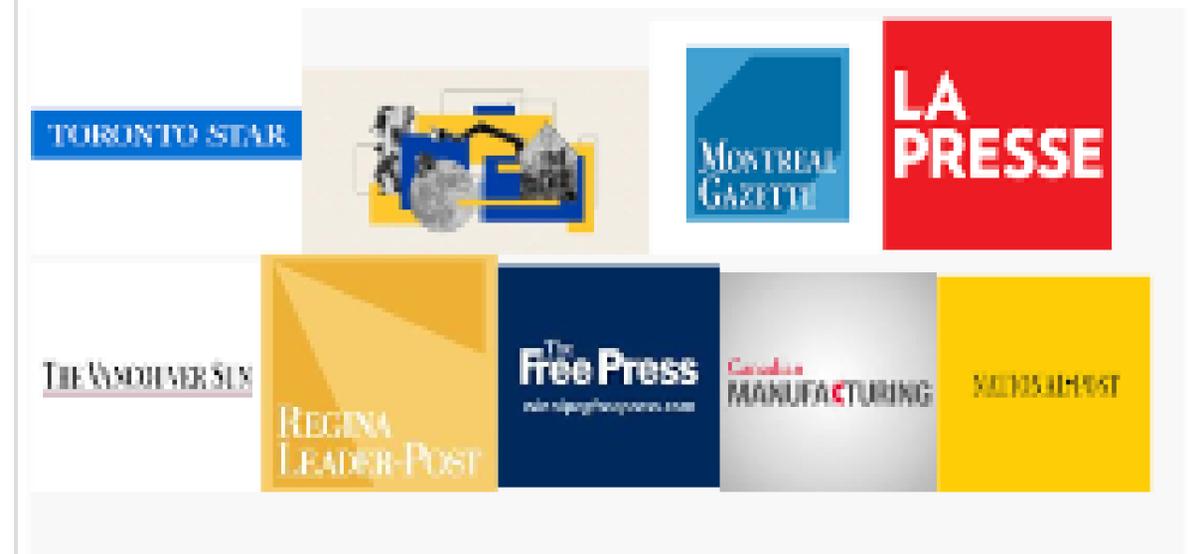
National Force

Getting the word out across Canada and internationally about the importance of advanced manufacturing in Canada, the outstanding and diverse capabilities of Canada's advanced manufacturing sector and workforce, and the work that NGen is doing to develop a world-class ecosystem is fundamental to achieving our strategic objectives.

In 2023-2024, NGen undertook to enhance our social media presence and our profile in Canada and internationally. Over the course of the year NGen's social media posts on LinkedIn and YouTube attracted 1,612,925 impressions. There were 100,431 engaged visits on NGen's website. We also had six editorials published and were quoted in 25 earned media articles which were picked up by 291 different outlets with a reach of over 29.5 million subscribers.

Media Impact Highlights

[YouTube.com/@NGenCanada](https://www.youtube.com/@NGenCanada)



In addition to our participation at international trade shows and conferences, NGen has been highlighted over the past year at the World Manufacturing Forum, Canada's Investment Roadshow for Hannover Messe, the Asia Pacific

Foundation's Canada in Asia conference, as well as at the OECD which is using NGen as a model in its study of the impact that advanced manufacturing clusters have on innovation and business growth.

International Strategy

NGen's international engagement objectives are to:

1. Promote Canada as a world leader in sustainable manufacturing and the strengths of Canada's advanced manufacturing ecosystem globally.
2. Attract advanced manufacturing talent and investment to Canada.
3. Assist our project partners commercialize their solutions in global value chains.
4. Help our members connect with innovation partners, suppliers, and potential customers in markets at the forefront of advanced manufacturing, particularly the USA, European Union, United Kingdom, Japan, Singapore, South Korea, and Taiwan.

In 2023-2024 NGen worked to enhance Canada's profile internationally as home of innovative advanced manufacturing solutions and green supplier of choice to the world. Our efforts in leading business delegations to key international trade shows for advanced manufacturing, like Hannover Messe and Formnext, were important in this respect. Our participation on the advisory board of the World Manufacturing Forum, OECD, and at other international meetings including the Asia Pacific Foundation's Canada in Asia conference in Singapore helped highlight Canada's advanced manufacturing ecosystem and the unique solutions arising from our projects to a global audience. NGen also developed media assets and provided speakers for investment attraction events in important markets for advanced manufacturing in partnership with Industry, Science, and Economic Development Canada, Global Affairs Canada, Destination Canada, and Invest in Canada. The largest of these investment attraction events was the Invest in Canada conference organized by GAC in partnership with over twenty municipal and regional economic development agencies from across Canada at Hannover Messe 2023.

NGen actively supported our project partners in commercializing their solutions internationally by supporting their participation at Hannover Messe 2023, Formnext, Nano-Japan, the UK Battery Show, and Greener Manufacturing Shows in Atlanta and Tokyo. Exhibitors preparing for Hannover 2024 were offered coaching to get the most out of the

trade show, support in developing business leads in Europe, and assistance from Canadian Trade Commissioners in booking business-to-business meetings at the fair.

To attract international investment into Canada's advanced manufacturing ecosystem and potential customers for advanced manufacturing solutions developed in Canada, NGen also worked with multinational manufacturing companies that have established investment funds, looking to identify suppliers, or source leading-edge technologies to address innovation challenges aligned with NGen's priority areas of focus, including the EV value chain, industrial decarbonization and circular manufacturing, biomanufacturing, advanced automation and robotics.

To help attract international talent to Canada's advanced manufacturing ecosystem, NGen partnered with members, Global Affairs Canada, in addition to colleges and universities across the country to develop an international recruitment campaign to attract international students to advanced manufacturing programs and job opportunities in Canada. A highlight was our Talent Goes North Fly-In to Boston.

Our AI matchmaking platform NGen Connect along with our international cluster connections have also assisted our members and Canada's Trade Commissioners identify potential innovation partners, customers, suppliers, investment, and talent attraction opportunities globally.

Financial Sustainability

In 2023-2024, NGen's Board of Directors approved a plan to secure NGen's financial sustainability beyond 2028 when currently available funding from the Global Innovation Clusters program ends. The plan now being executed sets out a strategy for NGen to raise funds from a variety of public funding agencies and private-sector investors, in addition to revenues earned from service fees, sponsorships, and other industry contributions.

Over the past year, NGen was able to secure \$5.8 million in funding from government sources over and above amounts previously committed, including:

- \$3.9 million in additional funding from ESDC for our Future Ready initiatives.
- \$1.5 million from the Canadian Space Agency for our Moonshot for Mining, Materials, and

Manufacturing (M4M3) funding program which aims to develop innovative technologies for lunar in-situ resource utilization that can be repurposed for industrial applications on earth.

- \$400,000 from NRC-IRAP to continue our Additive Manufacturing Demonstration Program in 2024-2025.

The following table summarizes the public sector funding that NGen has received to date, the amounts committed or expended in 2023-2024, and funding left to go.

Public Sector Funding Sources

| Funding Source | GIC Phase I | GIC Phase II | PCAIS | NQS | CSA | ESDC | NRC-IRAP | TOTAL |
|--|-------------|--------------|----------|---------|---------|----------|----------|------------------|
| Total Program Funding Available | \$249.8 M | \$177.2 M | \$30.0 M | \$7.0 M | \$1.5 M | \$19.8 M | \$1.3 M | \$486.2M |
| Expended/Committed prior to 2023/24 | \$229.8 M | 0.2 M | \$10.1 M | - | - | \$2.5 M | 0.5 M | \$243.1 M |
| Funding Available 2023/2024 | \$20.0 M | \$177.0 M | \$19.6 M | \$7.0 M | \$1.5 M | \$17.3 M | \$0.4 M | \$242.8 M |
| Funding used for Operations 2023/2024 | - | \$10.1 M | \$0.4 M | \$0.1 M | \$0.1 M | \$2.7 M | \$0.1 M | \$28.1 M |
| Strategic Ecosystem Initiatives 2023/2024 | - | \$4.5 M | - | - | - | - | - | 4.5 M |
| Project/Program Funding Commitments 2023/2024 | - | \$50.8 M | \$9.0 M | \$5.6 M | \$1.3 M | \$14.6 M | \$0.3 M | \$81.6 M |
| Funding Available Post 2023-2024 | - | \$109.6 M | \$10.2 M | \$1.3 M | \$0.1 M | - | \$0.4 M | \$121.6 M |

In April 2024, Canada's Federal Budget allocated an additional \$50 million to NGen over a two-year period to establish a Homebuilding Technology and Innovation Fund that will aim to accelerate the adoption of AI, robotics, advanced automation, sustainable materials, and new energy systems by offsite homebuilders with the objective of transforming more of Canada's homebuilding industry into an advanced manufacturing process.

Industry contributions also account for a significant proportion of the total amount invested in NGen-supported Technology Leadership projects and Strategic Ecosystem initiatives. Our objective is to leverage at least 150% of the amount that NGen invests in projects and ecosystem initiatives from

private-sector industry sources. In 2023-2024, industry contributions to both eligible project costs and ecosystem activities amounted to \$80.7 million.

NGen depends on industry contributions to support our operations as well. These contributions come from project administration fees, sponsorships, and other service charges. They amounted to \$5.5 million in 2023-2024 and accounted for 29% of the total revenue NGen received over the course of the financial year for operating purposes.

All in, industry contributions secured in 2023-2024 totaled \$27.1 million and accounted for 32% of total funding sources.



Technology Leadership Projects

NGen co-invests in industry-led collaborative projects that integrate technologies and manufacturing capabilities into transformative solutions or ecosystem assets that improve the competitiveness and growth potential of Canadian manufacturing and contribute benefits to Canadians.

By the end of March 2024, our project portfolio consisted of 210 projects in which NGen had invested \$291.8 million from five different funding sources:

1. Phase I of the Global Innovation Clusters (GIC) program from which we invested \$215.1 million in Technology Leadership projects.
2. Phase II of the GIC program from which we committed \$49.5 million to advanced manufacturing and EV value chain projects.
3. The Pan Canadian AI Commercialization Strategy (PCAIS) from which \$19.1 million was committed to projects enabling the commercialization of AI applications in advanced manufacturing.
4. The National Quantum Strategy (NQS) from

which \$5.6 million was committed to projects enabling the development, scale-up, and commercialization of quantum applications for manufacturing or advanced manufacturing solutions for quantum.

5. The Canadian Space Agency (CSA) from which \$1.25 million was committed to projects developing novel technologies for in-situ resource utilization on the moon with dual purpose applications on earth. CSA funding was matched by \$1.5 million in investments from GIC Phase II funding.

To date, our projects involve 796 partners, including 483 industry partners, 425 or 88% of which are SMEs, and 313 academic and research partners. NGen funding is leveraging an additional \$443.7 million in expected industry contributions, bringing total approved project investments to \$658.5 million. Across all projects approved to date, expected industry contributions now amount to 152% of NGen funding.

The actual amount that NGen invested in Technology Leadership projects in 2023-2024 amounted to \$39.4 million which was matched by an additional \$77.3 million in industry contributions.

NGen Technology Leadership Project Investments 2023-2024*

| Funding Stream | NGen Investment | Industry Contribution | Total Project Investment |
|-----------------------|-----------------|-----------------------|--------------------------|
| GIC Phase I | \$29.7 million | \$68.5 million | \$98.2 million |
| GIC Phase II | \$6.0 million | \$2.3 million | \$8.3 million |
| PCAIS | \$3.7 million | \$6.5 million | \$10.2 million |
| Total Projects | \$39.4 million | \$77.3 million | \$116.7 million |

* Excluding NQS and M4M3 projects which, although approved, did not incur any eligible project costs in 2023-2024. The total also excludes Future Ready and Additive Manufacturing Demonstration program investments which are classified as Ecosystem program investments rather than Technology Leadership projects.

Calls for Proposals

NGen launched five calls for project proposals in 2023-2024, covering:

- Advanced manufacturing and EV value chain projects supported by our GIC Phase II funding.
- AI applications in manufacturing supported by PCAIS funding.
- Quantum applications supported by NQS

funding.

- Lunar in-situ resource applications (Moonshot for Mining, Materials, and Manufacturing) supported jointly by CSA and GIC Phase II funding.

Previously NGen had run six types of funding challenges. In June 2019, we launched an open

call for proposals for world-leading advanced manufacturing projects as well as for SME capacity-building projects.

In March 2020, we launched our COVID Rapid Response Challenge to develop and bring to market critical products required to fight the pandemic within a six-month period. NGen launched another call for project proposals in June 2020 targeted at developing autonomous disinfecting robots for health care and other workplaces. In September 2020 we launched our

Made Smarter Challenge to build competitive production and supply capabilities in Canada to ensure the sustainable long-term supply of products critical for fighting the pandemic. Our first call for project applications related to the development of advanced manufacturing capabilities in Canada's Electric Vehicle value chain was launched in September 2021. Our first call for project proposals to accelerate the commercialization of AI solutions in manufacturing supported by PCAIS funding was launched in September 2022.

Projects by Funding Challenge

| Project Challenge | # Projects | Total # Project Partners | #Industry Partners | #SME Partners | # Research Partners | NGen Investments | Total Project Investment | Investment Leverage Ratio |
|--|------------|--------------------------|--------------------|---------------|---------------------|------------------|--------------------------|---------------------------|
| Phase I COVID Rapid Response Challenge | 16 | 32 | 23 | 22 | 9 | \$38.5M | \$50.7M | 32%* |
| Phase I Disinfecting Robots | 5 | 7 | 7 | 7 | 0 | \$4.6 M | \$9.5 M | 107%* |
| Phase I Made Smarter Challenge | 12 | 54 | 35 | 34 | 19 | \$25.2 M | \$56.0 M | 122%* |
| Phase I EV | 14 | 59 | 34 | 28 | 25 | \$29.4 M | \$64.3 M | 119% |
| Phase I Open Call Projects | 118 | 531 | 273 | 237 | 258 | \$117.5 M | \$345.0M | 194% |
| Phase II Advanced Manufacturing | 17 | 50 | 48 | 41 | 2 | \$36.4 M | \$99.0 M | 172% |
| Phase II EV | 5 | 11 | 11 | 9 | - | \$13.0 M | \$38.8 M | 198% |
| PCAIS | 12 | 31 | 31 | 24 | - | \$19.1 M | \$55.1 M | 188% |
| NQS Quantum | 4 | 9 | 9 | 9 | - | \$5.6 M | \$12.0 M | 114% |
| M4M3 (CSA+11) | 7 | 14 | 14 | 14 | - | \$2.5 M | \$5.1 M | 104% |
| Total | 210 | 796 | 483 | 425 | 313 | \$291.8M | \$735.5M | 152% |

* Note that NGen was not required to raise industry contributions for our COVID-related projects.

Project Status

By the end of March 2024, all 165 GIC Phase I projects had been closed out. Of the 45 projects

approved under new funding streams, 30 were contracted and underway.

| Project Status | # Projects | Total # Project Partners | # Industry Partners | # SME Partners | # Research Partners | NGen Investments | Total Project Investment | Investment Leverage Ratio |
|-------------------------------------|------------|--------------------------|---------------------|----------------|---------------------|------------------|--------------------------|---------------------------|
| Completed & Closed Out | 165 | 681 | 370 | 328 | 311 | \$215.1M | \$525.4 M | 144% |
| Approved & Underway | 30 | 66 | 64 | 50 | 2 | \$56.8M | \$156.1M | 175% |
| Approved/ Not yet Contracted | 15 | 49 | 49 | 47 | - | \$19.9M | \$53.9M | 171% |
| Total Projects | 210 | 796 | 483 | 425 | 313 | \$291.8M | \$734.M | 152% |

Project Partners

As of the end of March 2024, NGen's overall project portfolio involved 796 partners working collaboratively to develop transformative manufacturing solutions - an average of 3.8 partners per project. (These numbers do not include the more than 1,750 members of the advanced manufacturing clusters funded by NGen.)

There were 483 industry partners (2.3 per project), including 425 SME partners with fewer than 500 employees (2.0 per project), involved in NGen projects. SMEs account for 88% of industry partners and 53% of all project partners. SMEs lead 193 or 92% of all projects. A full 166 projects (79% of the total) involve only SMEs.

Large companies account for 56 or 12% industry partners and are involved in 50 or 24% of all projects. There are 13 different large companies headquartered outside Canada engaged in 15 projects and 21 different large Canadian-based companies involved in 37 projects. While 18% of all NGen funding is allocated for projects involving large companies (4% to foreign-based and 14% to Canadian firms), reflecting the relatively larger size of their investments, projects with large company participation have higher rates of partner participation (5.4 partners per project) than those that do not (3.3 per project). They also have higher

rates of investment leverage. This has enabled their smaller project partners to participate at lower levels of contribution or attract more co-investment from other funding sources.

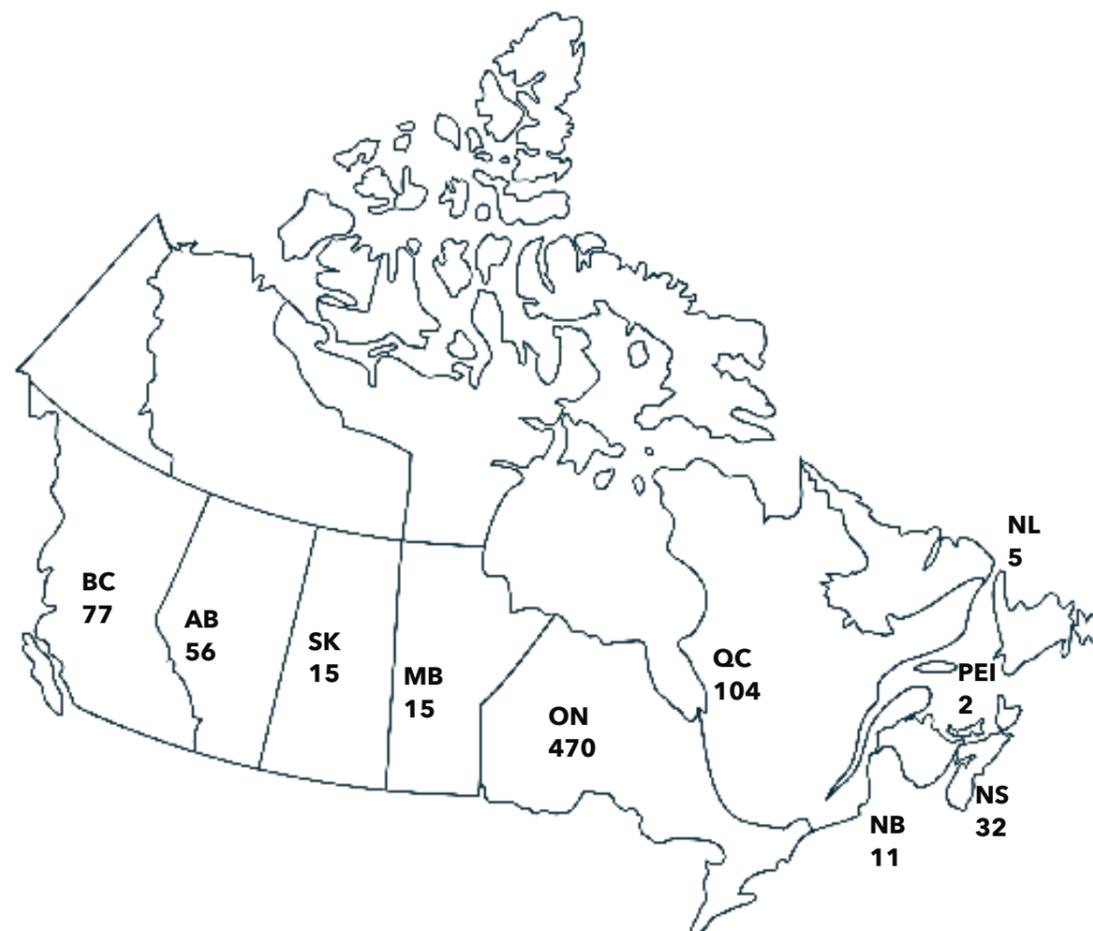
NGen's Technology Leadership projects also involve 313 academic and research partners from universities, colleges, hospitals, the National Research Council, and other research organizations (1.8 per project). Among the research groups involved in NGen projects, 221 are from universities, 62 from colleges, 23 from research institutes including seven from the National Research Council, and seven from hospitals and health care centres. The top ten ranked academic research partners in terms of engagement in NGen projects are listed below.

| Rank | Institution | # of Projects | Rank | Institution | # of Projects |
|------|------------------------|---------------|------|--|---------------|
| 1 | University of Waterloo | 30 | 6 | Dalhousie University University of Guelph | 10 |
| 2 | University of Toronto | 28 | 7 | McGill University | 9 |
| 3 | McMaster University | 20 | 8 | University of Alberta Georgian College | 7 |
| 4 | Western University | 15 | 9 | Universite Laval Queen's University Conestoga College | 6 |
| 5 | UBC | 14 | 10 | University of New Brunswick Humber College Lambton College | 5 |

The strategic role that NGen plays in knitting together Canada's advanced manufacturing ecosystem by connecting and supporting collaboration among researchers, technology

companies, and manufacturers across the country is evident in the geographic distribution of project partners.

Project Partners Across Canada



Project partners are involved in province Canada. The distribution of industry partners and research

groups is detailed below.

| Location | Industry Partners | Research Teams | Total Project Partners |
|-------------------------|-------------------|----------------|------------------------|
| British Columbia | 56 | 21 | 77 |
| Alberta | 37 | 19 | 56 |
| Saskatchewan | 9 | 6 | 15 |
| Manitoba | 10 | 5 | 15 |
| Ontario | 278 | 192 | 470 |
| Quebec | 66 | 38 | 104 |
| New Brunswick | 6 | 5 | 11 |
| Nova Scotia | 18 | 14 | 32 |
| Prince Edward Island | 1 | 1 | 2 |
| Newfoundland & Labrador | 2 | 3 | 5 |
| International | - | 9 | 9 |
| Total | 483 | 313 | 796 |

While 59% of NGen project partners are based in Ontario, 13% are located in Quebec, 10% are in British Columbia, 11% in the prairie provinces, and 6% in Atlantic Canada. NGen projects also bring partners together across provinces - 81 projects (39% of the total) involve partners from more than

one province. Nine projects involve collaboration with international research partners - three based in Germany, two in the United States, and one each in the United Kingdom, Japan, France, Italy, and Germany.



World-Leading Advanced Manufacturing Solutions

NGen's projects integrate advanced digital, materials, and production technologies in the development, adoption, and scale-up of unique solutions for manufacturing. We added 39 projects to our project portfolio in 2023-2024, in addition to six PCAIS projects approved in early 2023.

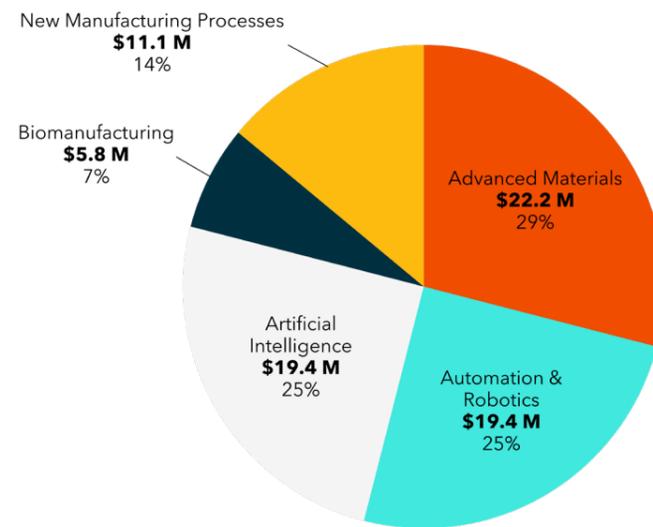
The types of solutions and primary sectors of application of our Technology Leadership projects supported by GIC Phase II, PCAIS, NQS, and CSA funding over the past year reflect in large part our more targeted calls for proposals in each of the post Phase I funding streams.

These solutions are being developed for and applied in a variety of industry sectors.

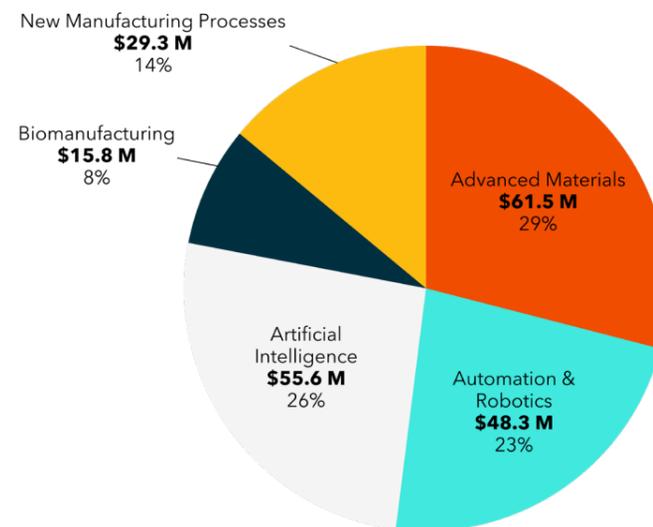
Materials processing, health care products (therapeutics as well as medical devices), additive manufacturing, electric vehicles, and equipment manufacturing sectors account for the bulk of the projects that NGen has invested in over the past year.

A full list of the projects contracted by NGen by the end of March 2024, identifying project leads, the number of project partners, and amounts of NGen funding and total project investment can be found in Annex 2.

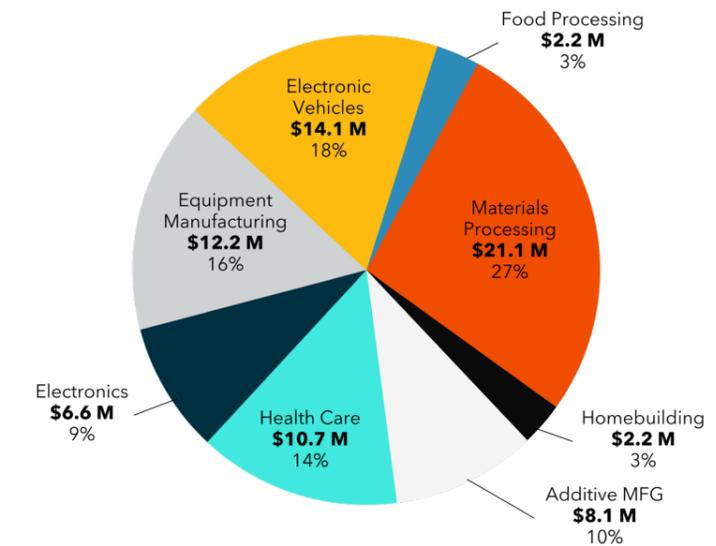
NGen Funding in Approved Post Phase I Projects by Type of Solution



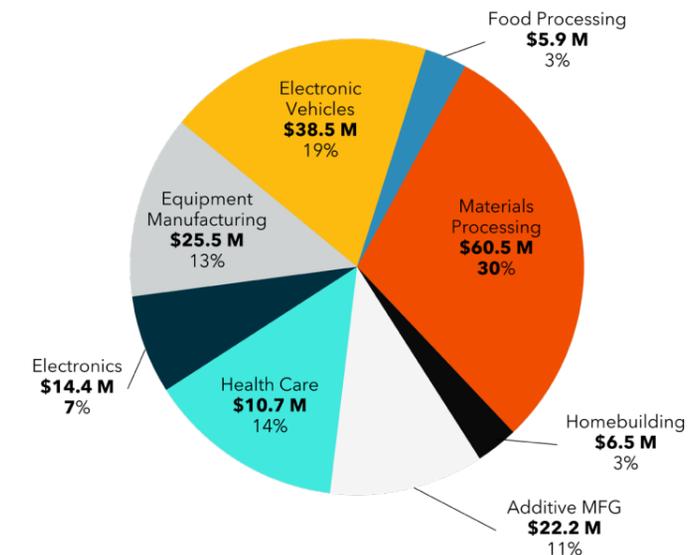
Total Investment in Approved Post Phase I Projects by Type of Solution



NGen Funding in Approved Post Phase I Projects by Sector of Application



Total Investment in Approved Post Phase I Projects by Sector of Application



Health Care

NGen's project investments in Canada's health care sector not only have the benefit of developing new products, production processes, and commercial opportunities for the sector, but also protecting the health and safety of Canadians, and ultimately saving lives.

NGen added six new health care related Technology Leadership projects to its portfolio in 2023-2024:

- The **Centre for Commercialization of Regenerative Medicine (CCRM)** in Toronto is partnering with BioVectra in Charlottetown, Global Life Sciences Solutions and Precision NanoSystems in Vancouver, Northern RNA in Calgary, and OmniaBio in Toronto to expand capacity and strengthen Canada's supply chain for the biomanufacturing of therapeutic products.
- **Octane Orthobiologics** in Kingston is working with the C3i Centre in Montreal and the Orthopedic Innovation Centre in Winnipeg to advance the biomanufacturing of cartilage implants.
- The **Orthopedic Innovation Centre** in Winnipeg is also working with OrthoPediatrics Canada based in Laval QC and Spinologics in Montreal to develop an additive manufacturing process for the production of biomedical lattices.
- **Petra Hygienic Systems** in Concord, ON is partnering with Mastrin Digital Solutions in Calgary and SIDAC Automated Systems in Toronto to implement a lights-out, fully autonomous, end-to-end manufacturing system for hygiene products.
- **Cosm Medical** in Toronto is working with Hamilton Health Sciences, Emerson Media and Objex Unlimited in Toronto to apply AI in the manufacturing of patient-specific gynethotic devices. The project is supported by PCAIS funding.
- **Keirton** based in Surrey, BC is partnering with Organigram in Moncton to develop a an AI-enabled machine vision quality control system for medical cannabis. This project is also supported by PCAIS funding.

These projects are in addition to those supported by Phase I GIC funding and that have now been completed. In the field of therapeutics:

- **Axolotl Biosciences** in Victoria worked with Starfish Medical and researchers from the

University of Victoria, University of British Columbia, and Simon Fraser University to scale up the production of BrainPrint bioink. BrainPrint can be used to print human brain tissue models as a tool for understanding neurodegenerative diseases as well as for drug screening. BrainPrint represents a first in its class technology, which will further promote Canada as a leader in 3D printing. The project will promote the capabilities of both companies in the Canadian Additive Manufacturing landscape and grow manufacturing capacity in 3D bioprinting in Canada.

- **Immunovaccine Technologies** in Dartmouth, NS worked with researchers at Dalhousie University and the Canadian Centre for Vaccinology to establish a complete end-to-end Canadian supply chain for the development and manufacturing of synthetic vaccines allowing production of large-scale quantities of the DPX-COVID-19 vaccine for Medicago.
- **iVexSol Canada** partnered with the Canadian Centre for Regenerative Medicine and GE Health Care in Toronto to develop a new process for manufacturing lentiviral vectors, an essential product for delivering cell- and gene-based therapies to patients suffering from cancer or rare or inherited genetic disorders. This project was closed as a result of the pandemic.
- **Mediphage Bioceuticals** in Toronto and Ardra in Ottawa, along with researchers at the University of Waterloo, University of Toronto, and Lambton College completed a pilot project that developed bacterial frameworks for biomanufacturing of industrial and therapeutic products. The fermentation-based framework extracts biomaterials in a less resource intensive way than existing processes and can also be deployed in the food industry.
- **OmniaBio**, based in Hamilton, ON, partnered with ExcellThera, Morphocell Technologies, and the Canadian Advanced Therapies Training Institute in Montreal, Aspect Biosystems in Vancouver, as well as research teams from BioCanRx, the Ottawa Hospital Research Institute, Canadian Centre for Regenerative Medicine, Deeley Cancer Centre, University Health Network, and Krembil Research Institute, and McMaster University in Ontario, Université Laval and Hôpital Maisonneuve-Rosemont in Quebec, and the University of Alberta to develop a biomanufacturing ecosystem with

a R&D hub based at McMaster Innovation Park in Hamilton. This project will facilitate the attraction of a broader supply chain of companies that supply viral vectors, plasmids, biobanking, cell culture, logistics, and other services critical to the biomanufacturing ecosystem. OmniaBio's targeted focus on process development, advanced manufacturing platforms, analytics and regulatory development through the NGen project, will catalyze further technology development in Good Manufacturing Processes production and commercial scale biomanufacturing.

- **Providence Therapeutics** with operations in Toronto and Calgary partnered with Northern RNA in Calgary to expand manufacturing capacity for Providence's PTX-COVID19-B mRNA vaccine leading to Phase 3 clinical trials and commercialization.

At the outbreak of the pandemic NGen also invested in projects to manufacture test kits for COVID-19:

- **International Point of Care** in Toronto partnered with Precision Biomonitoring in Guelph, ON, Immune Response Diagnostics in Toronto, and Suncor Energy in Calgary to expand production of its COVID-19 In-Vitro Diagnostic Products.
- **LuminUltra Technologies** of Fredericton, NB developed and scaled up production of rapid portable RNA-based PCR tests for COVID-19.
- **Precision Biomonitoring** in Guelph partnered with Evik Diagnostics in Kanata, ON to repatriate production of lyophilized COVID-19 rapid PCR tests (using freeze-dried reagent beads) from the United States.
- **Response Biomedical** in Vancouver scaled up the production of its rapid point-of-care RAMP screening test for COVID-19.
- **Sona Nanotech** in Halifax partnered with the VIDO-Intervac Research Centre in Saskatoon, the University of Saskatchewan, and the Runnymede Healthcare Centre to deploy Sona's proprietary nanotechnology to develop a rapid point-of-care antigen test to screen for COVID-19. The project also led to the development of a digital app that enhances lateral flow tests and readers improving the end user experience. Sona has now been transformed into a medium-size rapid test manufacturing facility that has the ability to develop and manufacture multiple rapid tests.
- **Exacad** of Boisbriand, QU developed a fast

method for manufacturing plastic injection molds for COVID-19 tests. Exacad's production filled a critical supply chain shortage in 2020 and helped to sustain Canadian production of test kits.

In the field of medical devices, NGen-funded projects not only responded to requirements during the pandemic but also led to the development and scale-up of equipment for other health care purposes:

- At the onset of COVID-19 **Starfish Medical** in Victoria led the **Canadian Emergency Ventilators** project. Starfish partnered with eight companies idled by the pandemic to redesign, re-engineer, and produce a state-of-the-art ventilator with components sourced in Canada. The fully digitized device was based on a patent licensed in the 1990s and early 2000s by Dr. Magdy Younes, Scientific Founder of Cerebra Health in Winnipeg. The patent was for an analogue device that has been used throughout the world, including during the 2003 SARS outbreak. Components were sourced from manufacturers across Canada including: Dorigo Systems in Burnaby, BC, Advance Test Automation in Milton, ON, Powersonic Industries in Bolton, ON, Dometic in Vancouver, and Yorkville Industries in Pickering, ON. Celestica procured the materials and manufactured the device at its facility in Newmarket, ON. The Canadian Emergency Ventilator was approved by Health Canada and was one of the first ventilators procured by the federal government during the pandemic. It has been deployed in health care facilities across Canada and internationally.
- **AiimSense** and Sorena Tech in Waterloo worked together with researchers from Georgian College, University of Waterloo, and Grand River Hospital to undertake a feasibility demonstration of sensors for stroke diagnosis. The project led to a solution that will reduce costs and improve user experience for patient care.
- **BOMImed** in Winnipeg worked with Synergy Mouldworks in Brantford, ON and Precision ADM also based in Winnipeg to design filters, design and fabricate moulds (including 3D moulded components), and manufacture and assemble breathing filters for ventilators and other breathing devices.

- **Cloud Diagnostics** in Kitchener, ON is partnering with researchers at the University of New Brunswick to scale up production of its Cloud DX Pulseware Solution for monitoring hallway health care patients.
- **DMF Medical** in Dartmouth, NS partnered with a research team at Dalhousie University to scale up production of its Memsorb™ filters that remove carbon dioxide from the breathing stream of machines, allowing for their repurposing as ICU ventilators.
- **Myant**, a textile computing company based in Toronto ramped up production of smart garments for patients and front-line health care workers that can read body temperature, blood pressure, and body chemistry. Biometrics from the user's body is collected via sensors, analyzed by Myant's Platform which uses AI to identify signs of health issues, and alerts are then forwarded to health care providers.
- **Myant's** second project funded by NGen allowed it to partner with UrTech in Burlington, ON, Applied Brain Research in Toronto, and Microart Services in Markham, as well as with research teams at the University of British Columbia, University of Toronto, Toronto Metropolitan University, RWTH Aachen, and Tokyo Institute of Technology to test and validate its smart textile technology and digital monitoring system for patient care taking different environmental and demographic conditions into account. The project helped prove that Myant's smart textiles can be used for remote monitoring of hospitalized patients and seniors in long-term care homes.
- The **Orthopedic Innovation Centre (OIC)** in Winnipeg partnered with Pega Medical in Laval, QU, Spinologics in Montreal, Conceptualiz in Halifax, and Precision ADM in Winnipeg along with researchers from the Centre de métallurgie du Québec, Red River College, McGill University, and the University of Manitoba to develop and validate automated medical device software for improved additive manufacturability. The purpose of this project was to create a fully integrated platform for additive manufacturing of patient-specific, customized implants based on pre-operative imaging and physician input. Project results related to the rapid design and additive manufacturing of customized and complex parts are also transferable to other manufacturing sectors.
- **Synaptive Medical** in London, ON worked with MRIIdt and researchers at Western University also

in London to develop a process to manufacture complex gradient electromagnets for use in magnetic resonance imaging (MRI). The project is scaling up production of Canada's first compact head-only MRI system that has the potential to greatly increase access to MRI scans at point of care in the healthcare system.

NGen has also made significant investments to enable the sustainable manufacturing and supply of critical personal protective equipment (PPE) in Canada.

- Five projects led by **Global DWS** in Toronto, a partnership between **PrescientX** and Clearpath Robotics in Cambridge, **A&K Robotics** and Sanctuary Cognitive Systems in Vancouver, **Advanced Intelligent Systems** in Burnaby, BC, and **CrossWing** in Aurora, ON developed autonomous robots to disinfect large floor spaces and high-touch surfaces in health care, commercial, and other public settings. The projects also led to improvements in autonomous robot technology that project partners are now deploying in further development and commercialization activities.
- Other sterilizing solutions were also developed. **Envision SQ** in Guelph partnered with the University of Guelph and the Xerox Research Centre in Mississauga to develop large-scale processes to produce an advanced self-sterilization coating that kills the COVID-19 virus on contact. Applications are on hard and high touch areas. **McRae Imaging** in Mississauga worked with Dot Automation in Vaughan, ON, Lumentra in Toronto, and researchers from the University of Toronto to develop and manufacture nano-material antimicrobial shielding.
- Three projects were undertaken under NGen's COVID-19 Rapid Response Challenge in 2020 to scale up production of protective face shields on an urgent basis. **Mosaic Manufacturing** partnered with Rockmass Technologies and Redetec also in Toronto and Gila in London, ON to develop a distributed network to 3-D print face shields which were distributed to nursing homes, hospitals, child care facilities, dental offices, grocery stores, and many other front-line and second-line areas. In a second project, **Burloak Technologies** in Oakville worked with Hamilton Health Sciences to design, test and scale up additive manufacturing of 500,000 shields. **Molded Precision Components** in Oro Medonte, ON partnered with Sterling Industries in Concord, ON and Georgian College to manufacture face shields as well.

MPC produced 15 million shields for the federal government, 11 million shields for the Ontario government, one million for Alberta, and donated 25,000 shields to local community organizations.

- Four projects focused on the automation of high-quality respirators and face masks. While partners in these projects have been unable to maintain production and sales as demand for respirators has dropped significantly post-pandemic, they have nevertheless created production capacity in Canada for domestic procurement. **Armfoam** in Longueuil, QU partnered with Roswell DHT in Calgary using proprietary pressure molding technology to develop and produce different sizes of mask with new biodegradable filter material. **Eclipse Automation** in Cambridge, ON also automated production of N95 masks and now has the capacity to manufacture 20 million masks annually because of the project. **Fidelity Machine** and Mould Solutions in Calgary partnered with Sentient Tools Engineering and Fidelity Medical Manufacturing based in Calgary and researchers from the University of Alberta to improve the manufacturing process for medical grade surgical and procedural face masks using advanced manufacturing technologies. **PrescientX** in Cambridge, ON also partnered with Big-Nano in Waterloo, ON, and research teams from McMaster, Guelph, and Waterloo universities to develop and automate the production of N100 masks.
- Other projects involved the development and manufacturing of new materials for PPE. **Carmina de Young Fashion Design** in London, ON partnered with Lifecycle Health in London and Lifecycle Revive in Brantford, ON and researchers from McMaster University and Lambton College to create a unique, self-contained sustainable supply chain of disposable isolation gowns and other PPE. **Fine Cotton Factory** in Toronto worked with Microbonds in Markham and researchers at George Brown College, Waterloo University, York University, and McMaster University to achieve mass production of antimicrobial textiles containing metals such as silver, zinc, and copper for PPE and other applications of metal-infused fibre. **MEA Health** in Kitchener and MLD Solutions in London partnered with researchers at Conestoga College to develop advanced recycling and integrated supply chain processes for single-use PPE. The project has created a ERP software system for material recycling. Waterloo-based **Big-Nano** partnered with Swenco in Waterloo, PrescientX in Cambridge, APC Filtration in Brantford, Titan

Clean Energy in Craik, SK and researchers at the University of Waterloo to set up a pilot plant to produce melt-blown nanofiber filter material for PPE and air purification filters with the objectives of helping Canada gain self-sufficiency for critical nanofiber melt-blown material supply. The project led to the development and approval of biodegradable filter media, as well as the development of marine-safe biodegradable filters, and the development of an electric battery separator. **Titan Clean Energy Products** in Craik, SK also develop and scaled up systems for biodegradable melt-blown resin and fabric production in partnership with Panther Industries in Davidson, SK, Big-Nano in Waterloo, Canada Masq in Markham, ON, and K+S Potash in Saskatoon along with researchers from Saskatchewan Polytechnic, University of Saskatchewan, Western University, and the University of Guelph. The project led to the development of new processes for biodegradable material production.

- NGen has also supported other advanced manufacturing applications in the health care sector:
- **Baxter Corporation** based in Mississauga partnered with Technology Trace in Rockwood, ON and Cheme Engineering in Campbellville, ON to optimize its medical device remanufacturing process.
- **Cosm Medical** in Toronto completed a pilot project along with partner Mui Scientific in Mississauga and researchers from Sheridan College, Western, Waterloo, and Guelph universities to scale up an advanced manufacturing process for medical consumables used in pelvic diagnostic imaging. **Cosm Medical** also worked with Agile Manufacturing in Beaverton, ON and researchers from Sheridan, Centennial, Humber, and Mohawk colleges, Western University, and the University of Waterloo on a pilot to 3-D print and semi-automate production of patient-specific pessaries.
- **Daxsonics Ultrasound** in Halifax worked with Synaptive Medical in Toronto and researchers at Dalhousie University to develop an automated manufacturing system for ultrasound transducers used in sterile surgery. The project will enable both companies to integrate advanced electronics into complex surgical technologies leading to better surgical outcomes for patients.

Automotive and EV Value Chain

Automotive manufacturing, including vehicle assembly and parts production, is one of Canada's largest industrial sectors, accounting for 10% of manufacturing output and 23% of our manufactured exports. The industry is in the midst of a major transformation away from vehicles powered exclusively by internal-combustion engines to Electric Vehicles (EVs). The EV value chain offers significant innovation, investment, and economic growth opportunities for the automotive sector and for Canada.

NGen's projects aim to improve the competitiveness of Canada's automotive sector and develop manufacturing capabilities throughout the Electric Vehicle Value Chain that not only address the innovation challenges of building a sustainable EV industry but also contribute to the development of stationary batteries and new energy storage and hydrogen energy solutions.

In 2023-2024, NGen approved six new projects for our portfolio in support of Canada's Zero-Emission Vehicle value chain. Two of those projects were contracted and underway at the end of March 2024:

- **Precision Resource** Canada is working with Miltera Machining Research Corp. to develop an advanced tooling process for critical hydrogen fuel cell components. Both companies are located in Cambridge, ON.
- **Ballard Power Systems** in Burnaby, BC is partnering with Acerta Analytics Solutions in Kitchener, ON to develop an AI-enabled factory acceptance testing system. This project is supported by PCAIS funding.

Among NGen's automotive-related Technology Leadership projects that have been completed:

- **AEM Power** in Windsor worked with Additive Metal Manufacturing and Macrodyne Technologies in Concord, ON, along with a research team at the University of Windsor, to develop a novel gas oscillation system for forming lightweight aluminum and magnesium automotive panels.
- **Apera AI** worked with Magna's Stronach Centre for Innovation in Aurora, ON and researchers from UBC, Simon Fraser University, the University of Victoria, and Georgian College to develop a 3D vision guided robotic assembly process.
- **Axiom Plastics** in Aurora, ON partnered with

MS Falcon in Toronto, Kytech Machine Works in Mount Albert, ON, and Bulldog Polymers in Alliston, ON, along with researchers from the University of Toronto, Ontario Tech University, Seneca College, and Humber College to create a new production process to manufacture interior and exterior vehicle plastic panels featuring a visually uninterrupted transition between different types of plastic. These transitions are typically between harder and softer polymers. The new process will result in lower overall part costs compared to incumbent technology processes. The project will allow Axiom to support lightweighting initiatives in the automotive sector, which is key to improving fuel economy and lowering emissions.

- **Kepstrum** in Vaughan, ON worked on a pilot project with Stackpole International in Mississauga, ON and Armo-Tool in London, along with researchers from McMaster, University of Toronto, Conestoga College, and Queen's University, to build an advanced end-of-line tester for bushing components which are critical subcomponents of Stackpole's hydraulic powertrain solutions. The pilot system utilized analytical algorithms developed in a prior feasibility study that correlate the gap-to-failure of parts that passed the end-of-line production test system based on variations in material properties and critical manufacturing parameters in the manufacturing process. The new advanced multi-functional end-of-line tester is an industry-first type of test system that can detect compound production deficiencies that are not detected by current uncorrelated and parallel production quality control processes.
- **KSL Lubricants** and Wolfdale Tool & Stamping in Mississauga collaborated with researchers from McMaster University to set up a pilot line for a new nanogel superabsorbent lubrication technology for automotive manufacturers. The pilot showed that the solution was able to reduce the amount of lubricant used by 65%, improve air quality, and cut overall waste by 80% from current methods used by the industry.
- **Magna's Stronach Centre for Innovation** in Aurora, ON partnered with Maple Advanced Robotics in Thornhill, ON as well as the University of Waterloo, University of Toronto, and Toronto Metropolitan University to develop an Autonomous Adaptable Robot System

(AARS), a novel robot integration solution for manufacturers who require flexible solutions for their growing product mix but may not have the scale of work or capital resources needed to justify larger investments in automation systems. The new system integrates 3D vision technology, artificial intelligence, and collaborative robots. It allows any operator with minimal training to be able to quickly modify the robot path and workspace. AARS will be able to carry out labor-intensive and dangerous processing tasks under dynamic and unstructured shop floor conditions. The solution will significantly expand the role of robots not only in large-scale or small and medium-size production, but also in the service sector, such as car body repair shops.

- **Marwood International** based in Tillsonburg, ON partnered with Dieffenbacher North America in Windsor, Aerlyte in London, and researchers from Western University and the Fraunhofer Centre for Composites Research to develop a novel process of lightweight automotive part manufacturing based on the recycling of thermoplastics.
- **Polyalgorithm Machine Learning** in Waterloo worked with Martinrea, one of Canada's largest auto parts manufacturers based in Vaughan, ON to develop an AI solution that will optimize output and reduce defects and equipment downtime.
- **ThinkData Works** in Toronto also worked with Martinrea and Palantir Technologies whose Canadian operations are based in Vancouver, along with researchers from the universities of Toronto and Waterloo to develop a digital solution based on external data analytics and predictive modeling to analyze supply chain risks. The solution can be used to provide logistical, geopolitical, and market-level assessments of supply chain risks and can be applied across all manufacturing sectors to improve supply chain transparency and resilience.

In addition to projects that will improve the competitive performance and reduce supply chain risks for Canada's auto parts sector, NGen also invested in collaborative initiatives that are building new advanced manufacturing capabilities throughout the Electric Vehicle Value Chain.

With respect to critical minerals:

- **CNEM** in Mississauga, ON and partners Talon Metals Services based in Thornhill, ON and

Palcan Energy in Burnaby, BC, together with researchers from the Universities of Guelph and Toronto, completed a project to develop a new recycling method for processing EV battery black mass using an environmentally friendly approach. (Black mass is the shredded material left after battery recycling and consists of high amounts of critical minerals such as lithium, manganese, cobalt, and nickel.) This green, energy-effective process is applicable to recycling black mass of all lithium ion-based batteries.

- **Li-Metal** in Markham, ON partnered with Blue Solutions in Boucherville, QC to develop a lower cost, lower carbon passenger electric vehicle format solid-state battery for next-generation automotive platforms. The project focuses on the development of high-performance ultra-thin lithium metal anodes suitable for use in large-format all-solid-state pouch cells for automotive applications and includes recovered lithium metal from both end-of-life batteries and production by-product generated at Blue Solutions manufacturing operations in Quebec. The lithium metal will be reprocessed using refining technology developed during the course of the project, for circular re-introduction into Blue Solutions' cell production process both in lithium ingots as well as in next-generation physical vapor deposited ultra-thin anodes.
- **Summit Nanotech** in Calgary used advanced materials to disrupt and transform conventional lithium mining processes by manufacturing and exporting environmentally sustainable lithium extraction modules. Summit uses nanotechnology-based materials that will be deployed in extraction modules for lithium mining customers globally. Along with partner Ionic Solutions, also based in Calgary, as well as researchers from the University of Calgary, the companies has built out the manufacturing and assembly line for these advanced materials and the extraction modules. The process aims to double lithium yield, reduce GHG emissions by 50%, minimize freshwater use, reduce land use area 26x, and cut chemical waste by 90% compared to traditional methods.

When it comes to batteries:

- **Calogy Solutions** worked with Linear Automation in Barrie, ON and researchers from Université de Sherbrooke, Cegep de Sherbrooke, Centre de métallurgie du Québec à Trois-Rivières, and l'École nationale supérieure des Arts et Métiers (in France), to

develop an intelligent pilot manufacturing line designed for high throughput and testing of Calogy's thermal management solution for lithium-ion batteries.

- **Electrovaya** in Mississauga partnered with Lantern Machinery Analytics in Vancouver, EECOMOBILITY in Hamilton, and researchers from UBC to scale up and commercialize a Li-battery electrode processing technology that is free of hazardous solvents. The process will reduce the environmental impact of lithium-ion battery manufacturing and enable a breakthrough in cost reductions which has the potential to realize significant global benefits.
- **Electrovaya** and EECOMOBILITY worked on a project, together with researchers from McMaster University, Waterloo, Western, Windsor, and UQAM, to develop pilot advanced manufacturing capabilities for high voltage electric truck and bus battery modules implementing a versatile, semi-automated laser welding line that can be adapted to a range of module architectures. Following this project Electrovaya will work on scaling up the module assembly manufacturing line and supply made-in-Canada modules for heavy duty e-mobility applications.
- **Electrovaya** also completed a pilot project with Ortech in Mississauga, the NRC, and researchers from the University of Toronto, UBC, and Waterloo University to develop a manufacturing process for solid state lithium batteries. As a result of the project Electrovaya has developed pilot scale manufacturing know-how to produce solid state batteries with 20% to 40% energy density.
- **E-Zn** in Toronto piloted an air cathode production line with AlumaPower and Lambton College in Sarnia, ON. The project set out to design the optimal process and construction specifications for a semi-automated facility to produce e-Zinc's air cathodes for AlumaPower's aluminum air battery, which exceeds the capabilities of Li-ion battery systems.
- As an industry-led Ecosystem Development project, the **Flex-Ion Battery Innovation Centre**, a division of Ventra Group in Windsor, ON, established a centre of excellence for advanced Li-Ion battery manufacturing, in collaboration with partners eCAMION based in Toronto, and the University of Toronto, University of Waterloo, Ontario Technical University, University of Windsor, and UBC. The partners are focusing on developing new advanced

manufacturing processes that will improve battery performance, minimize waste, and reduce costs and environmental impacts in battery production.

- The **Flex-Ion Battery Innovation Centre** also worked with Inspectech Analygas Group in Toronto and researchers from the University of Waterloo, Western, Windsor, McMaster, UQAM, and Ontario Tech University to develop and commercialize advanced manufacturing innovations and equipment to improve the performance of electric vehicle propulsion batteries and battery manufacturing systems. The partners are developing a localized mineral supply chain to enable cost-effective Li-Ion cell manufacturing in Canada, developing new processes to achieve a 20% increase in battery cell energy density along with a similar reduction battery weight, and designing new AI-enabled manufacturing systems that will reduce battery production time, cost, and scrap.
- **MicroGreen Solar** in Markham, ON carried out a pilot project with Rematek-Energie in St.-Laurent, QU and researchers at the University of Toronto and Centennial College that developed a mid-scale battery storage system demonstrating an assembly-disassembly process that enables the replacement of single cells and eliminates the need to scrap entire battery packs.
- **NOVONIX Battery** testing Services in Dartmouth, NS partnered with Well Engineered Solutions in Dartmouth, Dalhousie University, and Materials Atlantic (a cluster that is also supported by NGen) to develop manufacturing technology for the dry synthesis of cathode materials for use in lithium-ion batteries. It will also support the growth of a new specialist collaborative cathode dry synthesis research and development and manufacturing team. Another key objective of this project was to achieve automated handling and storage of the cathode powder materials from a high temperature cathode production line. All told, this will enable efficient and transformative manufacturing of highly engineered lithium-ion battery cathode materials through increased process flexibility, parameter controls, and safety.
- **Weber Manufacturing Technologies** in Midland, ON undertook a pilot project with VPN Research in Mississauga and the University of Waterloo to develop a production and recycling process for nickel materials used in EV batteries. Weber established a new carbonyl

system as a result of the project which was able to produce high quality nickel powder from the black mass of spent batteries.

In the field of hydrogen-powered vehicles:

- **Ballard Power Systems** in Burnaby, BC worked with Macrodyne Technologies in Concord, ON and Eclipse Automation in Cambridge, ON to develop a Next Generation Grafoil Plate Forming Pilot Line enabling new manufacturing and inspection methods. The project created a potential opportunity for the project partners to develop future hydrogen fuel cell plate fabrication and enhanced automation capabilities.
- **Cummins Canada**, which acquired Hydrogenics in Toronto, partnered with AIS Technologies in Windsor, Shelley Industrial Automation (ON) in Toronto, and Konnexio in London, ON to build a pilot production process for their core technology and a Centre of Excellence for high volume manufacturing of hydrogen fuel cells. The consortium collaborated with researchers from universities of Toronto, Waterloo, Quebec, and Alberta to address some of their material development and technology improvement requirements and characterization. The project will help to consolidate Canada's position as a global leader in hydrogen and hydrogen fuel cell expertise and supply capabilities.
- **Momentum Materials Solutions**, a University of Calgary spin-off venture, has developed a new reproducible, high performance, high durability, and low-cost membrane electrode assembly that is a potential solution for the hydrogen fuel cell market and is partnering with BlissEarth Energy Research also in Calgary and researchers from the university of Calgary to scale up development and manufacturing of its next generation MEA process.

In the field of powertrain, components, and advanced materials:

- **Polar Sapphire** in Oakville, ON partnered with Nature Alu in LaBaie, QU, Dynamic Concept in Saguenay, QU, and researchers from McMaster, Toronto, Queen's, and Western to establish a Canadian High Purity Alumina (HPA) consortium to demonstrate commercial production of superior grade alumina powder suitable for new and emerging electronics applications, primarily lithium-ion battery separators (LIBs) used in electric vehicles (EV), as well as future generation solid state batteries and other electronic components.

The consortium will develop the use of an advanced rotary calcination furnace, along with new milling and acid recycling systems that will demonstrate world-leading economic and environmental outcomes unmatched by conventional production methods. This will be Canada's first high-grade HPA production facility, spearheading new supply for this high-demand material and establishing Canada as a competing supplier to world markets based on production processes invented in Canada.

- **Precision Resource Canada** and partner Miltera Machining Research both in Cambridge, ON collaborated with research teams from the Universities of Waterloo and Aachen in Germany to achieve best-in-class advanced manufacturing solutions to establish, scale-up and commercialize critical zero-emission vehicle components for universal on-road mobility platforms. In addition to on-road mobility the technology can be leveraged to produce sustainable green energy, stationery and back-up power, and has the potential to transform other critical industries such as aerospace, off-road, and other heavy-duty applications.
- **Rayleigh Solar Tech** in Halifax and partner Magna International in Aurora, ON completed a project in collaboration with researchers from Concordia, Dalhousie, l'École supérieure de technologie, Nova Scotia Community College, and the University of Rome to develop a production-ready process for fabrication of solar integrated automotive polymer panels and to optimize Rayleigh's solar thin film manufacturing process for application in Magna's automotive polymer panel manufacturing process. The energy from the polymer panels can be used to extend the range of electric vehicles and reduce GHG emissions by reducing consumption of grid electricity produced from fossil fuels.
- **Linamar** in Guelph, ON partnered with Westhill Innovation in Simcoe, ON and McMaster University to scale up production of Westhill's inverter technology for use in zero-emission vehicles. (Inverters are electronic devices that convert Direct Current energy from the sun, for instance, to the Alternating Current electricity used in Electric Vehicles.) The technology uses 1/12th the space and mass of other competing inverters. This project will lead to the development of a manufacturing process to produce smaller, lighter inverters for use in Zero-Emission Vehicles.

- **Macrodyne** in Concord, ON worked with Linear Transfer Automation in Barrie, ON, Ridgetech Automation in Cambridge, ON, and researchers at the University of Guelph to develop an automated slitter table with weight

Aerospace

Aerospace manufacturing is another strategically important sector of the Canadian economy. The industry contributed over \$22 billion to GDP, employed nearly 207,000 highly skilled workers, and exported more than 75% of its total production to 186 countries around the world in 2020.

Among the NGen-funded projects that have completed to date involving development, scale-up, and adoption of technology solutions in Canada's aerospace industry:

- **DeepSight Réalité Augmentée** in Montreal partnered with Avior Integrated Products in Laval, QU to add a new holographic guide module to the DeepSight's augmented reality platform that will help workers assemble aerospace components and composite parts. The solution will significantly improve productivity and reduce the number of faults with employees empowered with immersive and intuitive instructions and can be used for training and skills development in other sectors of manufacturing.
- **Formula Solutions** in Burlington, ON collaborated with XYZ Automation Group in Burlington and Promation Nuclear in Midland, ON, McMaster University, Mohawk College and Fanshawe College to automate the manufacturing process for parts for aerospace engines. The solution is key to developing a domestic manufacturing capability in Canada for critical components for the aerospace industry.
- **McGuire Aero Propulsion Solutions** of Toronto, partnered with Burloak Technologies in Oakville, and Tekna Advanced Materials in Sherbrooke, QU to scale up and test additive

compensation technology for reducing scrap rate and reducing labour costs for compression molding of sheet molding compounds with a particular focus on Electrical Vehicles.

manufacturing processes for large, complex, zero-emission turbomachinery for the aerospace industry. The project will result in significant environmental benefits in the form of reduced materials requirements and associated carbon emissions. It will also help scale up large additive parts manufacturing capabilities in Canada.

- **MDA** in Ste.-Anne-de-Bellevue, QC partnered with Promark Electronics in Pointe-Claire, QU, AV&R in Montreal, and researchers from the National Research Council, Laval, Concordia, and l'École polytechnique to develop and demonstrate applications of advanced and highly flexible manufacturing technologies while successfully managing constant changes and maintaining mandatory manufacturing traceability. Focusing on quality and efficiency, the new systems will improve manufacturing methods around high-volume assembly, automated testing & inspection, and autonomous data management.
- **Reaction Dynamics Lab (RDX)** in Montreal worked with Amrikart Ressource Cybernetique in Brossard, QU and researchers at the National Research Centre, McGill University, and Polytechnique de Montréal to develop large-scale additive manufacturing capabilities for next generation eco-friendly hybrid rocket engines that will pave the way towards routine access to outer space. RDX's breakthrough propulsion technology provides the means to a Zero-Carbon footprint orbital launch solution. RDX intends to manufacture and operate its orbital rockets for small satellite launch as a service while turning recycled polymers into high-performance rocket fuel.

Food Processing

The food and beverage processing sector is the second largest manufacturing industry in Canada accounting for approximately 20% of manufacturing GDP. It supplies approximately 70% of all processed food and beverage products available in Canada and is the largest buyer of Canadian agricultural products. About a third of Canada's output is exported to 192 countries around the world, making the sector a critical supplier supporting the food security of Canadians and a broader global population.

NGen added two new projects to its portfolio in support of digitizing the food processing sector in 2023-2024:

- **FPS Food Process Solution Corp** in Richmond, BC is partnering with the St. Germain Bakery in Toronto to develop and implement a fully automated manufacturing system.
- **Panevo Services** in Vancouver is working with Saputo Dairy Products in Montreal to develop and implement an advanced scheduling optimization system.

NGen has invested in a number of other projects, now complete, that involve the application of advanced manufacturing technologies to improve production efficiencies and develop new methods of handling and processing food products:

- **Aspire Food Group** in London, ON partnered with Telus Agriculture and Regenerative Waste Labs in Vancouver, Darwin AI in Waterloo, and researchers from the universities of Laval, McGill, Guelph, Western, Toronto, and Waterloo, to build the lowest-cost, highest-density, and most ethical automated food-grade protein production system in the world based on processing crickets into all natural, sustainable, super-food ingredients that are nutritionally and environmentally superior to most alternatives. Aspire is targeting markets that utilize crickets and their by-products in human and pet nutrition, biomedicine and agrochemicals with a vision to mitigate climate change and alleviate global food insecurity. The project incorporates industrial automation and robotics, IoT, and deep learning/analytics in the development of fully automated and modular production systems that can be scaled to any size in any geography. In 2022, the project was selected by UNESCO as one of the Top Ten AI applications in the world in support of the United Nations' Sustainable Development Goals.

- **Enertics** in Milton, ON carried out a successful pilot with Skjodt-Barrett Foods in Brampton and researchers at Mohawk, Lambton, George Brown, and Humber colleges that implemented an online monitoring and predictive maintenance system for critical assets in the food and beverage sector. The project created a use case in the industry and provided a test bed for the further development of Enertics technology.
- **Mycionics** worked with Whitecrest Mushrooms in Putnam, ON, Piccioni Mushroom Farm in Dundas, ON, and researchers at Western University to develop and manufacture robotic mushroom harvesters capable of continuously picking mushrooms for fresh market quality and precise sizing. The technology will be the first of its kind in the world.
- **Panevo Services** based in Vancouver partnered with AccuEnergy Canada in Toronto in a pilot to trial and validate a novel, pre-commercial real-time Operating Equipment Efficiency monitoring and reporting solution for equipment in dairy processing operations and assess its potential impact for the Canadian advanced manufacturing ecosystem. The pilot was supported by Microsoft Canada. Upon Completion of the pilot, Panevo and AccuEnergy worked with Saputo Dairy Products in St.-Laurent, QU and researchers from Waterloo and Toronto universities to implement and demonstrate their solution in four Saputo processing plants. Panevo's solution can also be applied in a variety of manufacturing sectors in addition to food processing.
- **Quali Artificial Intelligence** based in Kitchener, ON undertook a project with Riverside Natural Foods in Vaughan, ON, Axiom Plastics in Aurora, ON, and Terra Cotta Foods in Georgetown, ON to assess the feasibility of developing and scaling up an AI powered plug-and-play camera solution that automates a visual quality inspection for food processing. The project tested a variety of Quali AI solutions across use cases in food processing as well as the automotive sector, proving that the company's AI solutions achieved greater quality control accuracy than human inspectors.



Advanced Materials

The development and scale-up of innovative manufacturing processes for advanced materials represents a significant share of NGen's project investments.

In 2023-2024, we added twelve projects to our advanced materials manufacturing portfolio, eight of which had been contracted by the end of March 2024:

3D BioFibR in Halifax is collaborating with Plantform Corporation in Toronto to develop innovative processes for manufacturing recombinant collagen fibre.

AEM Power Systems in Windsor and Macrodyne Technologies in Vaughan, ON are building a full-scale demonstration of gas oscillation superplastic forming technology.

Carbcrete in Montreal and Macron Industries in Port Colborne, ON are working on new applications of Carbcrete negative-carbon cement-free concrete technology.

Geomega Resources in Boucherville, QC and NeoCtech in Candiac, QC are developing a process to recycle and produce rare-earth oxides from permanent magnet scrap.

Nfinite Nanotechnology in Waterloo, ON is partnering with Eti Converting Equipment in Longueuil, QC to develop a process for high-throughput roll-to-roll spatial atomic layer deposition.

Zs2 Technologies in Calgary is working with Falkbuilt and Occam's Technologies in Calgary, LithiumBank Resources in Vancouver, and Progressive Planet Solutions in Richmond, BC to scale up its advanced manufacturing process for the production of magnesium cement boards.

Supported by PCAIS funding:

- **Ayrton Energy** based in Calgary is working with Pulsenics in Toronto to develop and implement an AI system to fast track electrochemical technology developments.
- **Basetwo Artificial Intelligence** in Mississauga is partnering with Resilience Biotechnologies, Genecis Bioindustries, and Aspect Biosystems to develop AI-enabled digital twins to accelerate biomanufacturing processes.

In other projects related to advanced materials manufacturing funded by NGen but now complete:

- NGen co-invested with ACOA, the Government of Nova Scotia, and the **Verschuren Centre** in Sydney, NS to establish the first of its kind bioprocessing facility in Canada that will provide small biotechnology firms access to its bio-reactor enabling them to pilot and scale up technologies for production of environmentally sustainable materials and products. The Verschuren Centre is also developing a bio-ingredient circular economies cluster with NGen support. The cluster brings SME clean technology companies together with manufacturers to replace petrochemical ingredients with bio-ingredients.
- **3D BioFibR** in Halifax carried out a feasibility study with researchers at Dalhousie University to develop a large-scale manufacturing process for its dry spinning technology that produces collagen nanofibers at 600X the rate of previous methods and with mechanical strength 3X greater than native collagen structures. Its spider silk manufacturing process has produced fibers that are as strong as steel, and more than 1000 times as tough. The adaptability of this technology to include a variety of proteins allows production of various biofibers for applications in multi-billion-dollar industries including life science research, medical applications, sustainable textiles, aerospace engineering, and defence.
- **Advanced BioCarbon 3D** in Rossland, BC conducted a feasibility study and pilot project with KF Hemp based in Regina, SK, Virtual Layer in Kelowna, BC, along with a research team at UBC to support the development of a commercial scale biorefinery for the production of high-performance bioplastics and other advanced materials made from hemp. The project helped scope out equipment and operating requirements for the facility.
- **Brilliant Matters Organic Electronics** in Quebec City carried out a pilot project with Raymor Industries in Boisbriand, QU and researchers at the National Research Council, Université Laval, and Université de Montréal that successfully scaled up a production process for organic semiconductors from bench to pilot scale while maintaining desired quality and stability. Organic semiconductors use only one-tenth the energy of silicon chips. The semiconductors produced at pilot stage were tested with highly positive results.

- **CarbiCrete** in Lachine, QU worked with Patio Drummond in St.-Nicéphore, QU, Innovative in Montreal, and researchers at McGill to pilot and scale up production of cement-free, carbon-negative concrete, drastically lowering the emissions involved in cement production which accounts for 8% of all greenhouse gas emissions worldwide. The pilot project successfully captured all emission monitoring and reporting requirements, validated the carbon quantification methodology, and helped fine tune and optimize Carbcrete's process for sequestering CO₂.
- **Datec Coating** in Mississauga collaborated with Ortech also in Mississauga, and researchers at Sheridan College, the University of Saskatchewan, and University of Waterloo to assess the feasibility of developing a commercial-scale process for manufacturing an alternative method of disinfecting wastewater that is safer and more environmentally friendly than current water treatment methods using sodium hypochlorite or chlorine dioxide as disinfectants.
- **Dispersa** in Laval, QU partnered with Project Clean in Vancouver and researchers at the Institut national de la recherche scientifique in Quebec City and Centre d'études des procédés chimiques du Québec in Montreal to scale up the world's first waste-derived process for manufacturing biosurfactants, which are active compounds secreted by the skin or produced on cell surfaces. They provide a natural ingredient for herbicide and pesticide formulations, detergents, health care and cosmetic products, pulp and paper, textiles, food, and fuel products.
- **Enercion** in Toronto developed an innovative product based on nano-porous materials that provides on-site energy with 4X the efficiency of solar panels, allowing buildings to reduce their energy costs by up to 60%. Enercion partnered with the University of Toronto and UofT's Impact Centre to audit Enercion's existing manufacturing process and develop a process for mass production. The project resulted in the development of a powder twice as effective as its previous product and has allowed Enercion to develop AI solutions to optimize its supply chain and smart manufacturing systems including component quality control, cobots for welding, and predictive maintenance.
- **Evercloak** in Kitchener, ON partnered with Zen Graphene Solutions in Thunder Bay and researchers at the universities of Guelph

and Waterloo on a pilot that developed a breakthrough manufacturing process capable of producing the world's thinnest and most uniform graphene oxide nano-coatings with the highest water vapour permeance ever measured. Evercloak also worked with Environmental Systems in Barrie, ON, Waterloo, Guelph, Lakehead Universities, Georgian College, and the US National Renewable Energy Laboratory to scale up its process for manufacturing nano-scale-thin Graphene 2D films. The films will allow dramatic energy efficiency improvements in heating and ventilation systems in critical environments to support sustainable manufacturing. The project was the first in the world to produce graphene oxide membranes at commercial scale, making Canada a leader in the emerging field of nanofilms as well as in high-standard Cleanrooms.

- **Exergy Solutions** in Calgary undertook a study with Suncor Energy, Archer BD, and the University of Calgary to explore the feasibility of converting bitumen-derived asphaltene into high-value carbon fibre with the potential to create a new industry for Alberta while lowering GHG emissions.
- **Genecis Bioindustries** in Toronto worked with Stormfisher in London, ON and researchers at the universities of Guelph, Waterloo, and Toronto to manufacture high-value bioplastics and chemicals from organic waste streams, contributing to a Canada's circular and bio-based economy.
- **Geomega Resources** in Boucherville, QU partnered with Rio Tinto Alcan in Montreal to conduct a feasibility study for the production of iron, aluminum, and rare earths from bauxite residues. The project established the technological feasibility of the process and has strengthened collaboration between the project partners.
- **Graphite Innovation and Technologies** in Dartmouth, NS partnered with K&D Pratt in Mount Pearl, NL and researchers at Dalhousie University to develop an innovative process to produce graphene-based marine coatings that prevent the leaching of toxic chemicals into water.
- **Imperial Mining Group** in Montreal, worked with Fusia Groupe in Ste.-Eustache, QU, and researchers from McGill and McMaster universities on a project to develop a vertically integrated ecosystem for the production

of novel scandium aluminum alloys for 3-D printing with applications in electric vehicle and aerospace manufacturing. The project was successful in developing a cost-effective replacement for titanium enhanced aluminum alloys and helped to de-risk industrial adoption of the technology.

- **Lantern Machinery Analytics** in Vancouver undertook a study with Zentek in Thunder Bay, ON and researchers at UBC, Western University, and the University of Waterloo to develop an algorithm that can characterize the dimensionality of nanomaterials. The project will allow Zentek to control the physical parameters of the graphene and graphene derivatives it produces allowing to target specific nanotechnology applications in advanced materials, biomedical treatments, and green fuel additives.
- **Macrodyne Technologies** in Concord, ON developed an alternate compression blow molding technology that can effectively process bioplastics, along with partners Competitive Green Technologies in Waterloo, ON and Fourmark Manufacturing in Oakville, ON. The project led to the manufacture of a viable biodegradable bioplastic alternative to single-use plastics using state-of-the-art compression blow molding technology incorporating automation and machine vision and inspection processes that can leverage this innovative material commercially across large-scale applications.
- **Nano Cnet** in Waterloo, ON partnered with Evercloak also in Waterloo along with researchers from the University of Waterloo to scale up a roll-to-roll continuous printing technology that merges graphene and nano-silver strands to significantly increase the conductivity and transparency of flexible transparent conductors while also reducing their thickness. This innovation in manufacturing will dramatically change the printed electronics industry, and the electronics industry in general, with applications in both automotive and aerospace sectors.
- **NetProCore** in Burlington worked with AI-Innovate in Hamilton, Hazelett CASTechnology in Calgary, and researchers from McMaster and Queen's universities and Fleming College successfully on a pilot project to create a digital twin of the aluminum strip casting process using computational materials science and data analytics. The project provided a use case for the deployment of digital twins in other

advanced materials processes.

- **Ora Graphene Audio** in Montreal completed a pilot with Locus Precision in Pontiac, QU, McGill University, and the International Certificate Centre in Richmond Hill, ON that developed the tooling and demonstrated full-scale production of high-graphene membranes that can be customized for a variety of applications in water filtration, PCB manufacturing, micro-speakers, hearing aids, TV speakers, cellphones, and gaming consoles to reduce energy requirements.
- **Polar Sapphire** in Oakville collaborated with Nature Alu and Dynamic Concept in Saguenay, QU along with researchers at McMaster, Toronto, Queen's, and Western Universities to develop an advanced process for High Purity Alumina (HPA) production. The project will showcase North America's first HPA production line, focusing first on battery applications.
- **ReDeTec** in Toronto partnered with an industrial partner in Brantford, ON and researchers from George Brown College, Lambton College, and Toronto Metropolitan University to scale up its advanced plastics reprocessing and recycling process. ReDeTec's technology mitigates plastic degradation in the recycling process and unlocks increased recyclability by using AI algorithms to determine optimal processing parameters.
- **Universal Matter** in Burlington, ON partnered with Hatch Engineering, Carbionix in Kitchener, and researchers from the University of Toronto and Rice University in the United States to scale up its "Flash Joule Heating" graphene manufacturing process. The project successfully developed automation and scalability with commercial opportunities in asphalt, rubber, and industrial coatings sectors.
- **USP Technologies** in Vancouver completed two successful feasibility studies. The first was with Brown and Caldwell Consultants in Burnaby, BC, Western University, and the Municipality of Middlesex Centre in Ontario to assess opportunities for the development of a new manufacturing process for the recovery of value-added materials from wastewater using advanced vacuum technologies. The second with researchers from Toronto Metropolitan University and the Municipality of Middlesex Centre assessed the feasibility of a new process to extract iron-based coagulants from metal wastes to improve environmental sustainability.

- **ZS2 Technologies** in Calgary completed a project with Progressive Planet Solutions in Vancouver, Occam's Technologies in Calgary and researchers from the University of Calgary to develop a pilot plant for magnesium

Additive Manufacturing

Canada accounts for only 2% of the world's \$15 billion production based on 3-D printed or additive manufacturing processes. However, Canada, and the National Research Council in particular, was a pioneer in the development of additive manufacturing technologies. The Canadian additive manufacturing ecosystem is relatively diverse and has a well-integrated value chain of knowledge, research, materials, engineering, and manufacturing capabilities including peripheral AI, robotics, computer automated design management, and printer manufacturing. Canada's additive sector also has globally recognized capabilities particularly in the fields of powder development and metal additive printing. The benefits of additive processes over traditional subtractive methods of manufacturing include waste and associated emission reductions and the design and manufacturing of complex products. Additive processes have also seen widespread adoption in Canadian manufacturing, especially in aerospace and biomedical sectors.

NGen approved and contracted three new additive manufacturing projects in 2024-2024:

- **Canadian Innovative Materials** based in Calgary is partnering with Manluk Mining in Wetaskiwin, AB, Suncor Energy also in Calgary, and researchers from the University of Alberta to develop metal additive processes for long-life tooling.
- **Mosaic Manufacturing** in Toronto is working with Microart Services and Wrmth Corp in Toronto to develop a micro-factory integrating additive manufacturing processes.
- With support from PCAIS funding, **Mosaic** is also working with Innovation AI in Hamilton and Matter and Form in Toronto to develop an AI-enabled additive manufacturing production engine.

Other Digital & Advanced Manufacturing Solutions

In 2023-2024, NGen approved 19 projects that involve the development and scale-up of other digital and advanced manufacturing solutions. Seven of those projects were contracted and underway by the end of March 2024:

- **OSCPS Motion Sensing** and AEONIX, both in Montreal, are scaling the production of autonomous navigation sensors.

concrete tiles for the construction industry that can significantly lower the emissions from conventional concrete manufacturing processes.

These projects complement our portfolio of projects that have been completed in the field:

- **Exergy Solutions** in Calgary, Suncor Energy's division in Beaverton, ON, and Precision ADM in Winnipeg, along with researchers from the University of Calgary, Red River College, University of New Brunswick, the University of Alberta, SAIT, NAIT, McGill, and the University of Manitoba worked on a project to deploy additive manufacturing technology within Canada's oil sands industry to reduce costs and wearability of tooling, improve performance, and eliminate tailings ponds.
- **Mosaic Manufacturing** in Toronto partnered with Objex Unlimited, ReDeTec, and Athletic Knit, also in Toronto, and PolyUnity in St. John's, NL to develop a novel large-scale additive manufacturing solution called Array. The solution is capable of cutting 3-D printing costs by 95%, increasing throughput by over 10X, and integrating eight different materials into a 3-D printed product. It allows one operator to run a system that is the equivalent of 250 individual 3-D printers.
- **Mosaic Manufacturing** also worked with Dyze Design in Longueuil, QU, Matter and Form in Toronto, and researchers from McMaster and Queen's universities to develop a new additive process called Vector which will allow the 3-D printing of metal filaments in textiles. The project has allowed Mosaic to develop a deal with the world's largest manufacturers of textile emblems (World Emblem) to support the rapid expansion of the Vector and Array additive systems for use in emblem manufacturing across North America.

- **Price Industries** in Winnipeg is partnering with Innovair Automation in Winnipeg and mode40 in Steinback, MB to automate its discrete manufacturing processes.

And, supported by PCAIS funding for the application of AI solutions in manufacturing:

- **Apera AI** in Vancouver is working with the Stronach Centre for Innovation in Aurora, ON to

deploy a high-speed AI-powered 3D inspection system.

- **Lantern Machinery Analytics** in Vancouver and e-Zinc in Toronto are developing a flexible and scalable AI manufacturing quality control system.
- **Linamar** in Guelph is partnering with Cyberworks Robotics in Oro-Medonte, ON to develop autonomous manufacturing equipment.
- **Linamar** is also working with Acerta Analytics Solutions in Kitchener, ON to enhance its component traceability capabilities.
- **Promise Robotics** in Toronto is partnering with Landmark Group of Companies in Calgary to deploy an AI-enabled robotic solution for building product prefabrication.

These initiatives complement our portfolio of digital and smart automation projects that are now complete:

- **ACQBuilt** in Edmonton completed a pilot project with Promise Robotics and researchers from Humber College, AMII, and the University of Alberta leading to the development of a prototype compact robotic cell for building wall panels. The prototype is on display at Promise Robotics lab as a showcase of the building industry and other companies interested in factory-based building component prefabrication and related robotic technologies.
- **Addem Labs** worked with COR Engineering in Toronto and researchers at the University of Toronto to scale up a new manufacturing process for printed circuit boards (PCBs). The objective was to develop a patented material and light-based technology to manufacture professional PCBs.
- **Aixel** in Waterloo completed a pilot project with Quali AI in Kitchener and Conestoga College to develop an AI-enabled quality inspection system. The project allowed the partners to demonstrate the vision system as well as the software platform that integrates automation, quality inspection, and data analytics.
- **Apex Industries** in Moncton, NB undertook a feasibility study with partner 709960 N.B Ltd. to help de-risk the development of a novel manufacturing process and installation method for manufactured stone veneer panels. This manufacturing process includes an automated concrete color 3D printer providing precise

volumetric and positioning control. The process will significantly reduce manufacturing and installation costs of color veneer stone panels and help reduce both waste and carbon emissions.

- **ArcelorMittal Dofasco** partnered with IBM Canada out of London, ON, Tenova Goodfellow in Mississauga, IFIVEO in Windsor, ON, and researchers at McMaster, Western, and Mohawk College to digitize Dofasco's hot-ladle steel manufacturing process. Digitization in heavy industry lags that of other manufacturing subsectors. This project will create value in advancing the state of understanding of the digitization process in Canada—in a real heavy manufacturing environment—including the process execution required to implement intelligence, the standards needed to enable the flow of data, and impact on the workforce.
- **Autometrics** in Vancouver, Marcon Metal Fab in Delta, BC, Mohawk College, and BC Institute of Technology partnered in a pilot project to develop and test an automated inspection system for robotics welding operations. The project accomplished a key step in AutoMetrics' product and business development plans, equipped Marcon with the latest technology in quality inspection, and engaged staff and students at Mohawk College in an advanced manufacturing project that requires multidisciplinary expertise and interactions.
- **Cast Analytics** in Vancouver, Empower Operations in Surrey, BC, and Applied CCM in Ottawa worked together with researchers at UBC and Simon Fraser University on a pilot project to develop and demonstrate a digital twin for metal casting with integrated AI-driven optimization capabilities, a transformational step for the foundry industry which traditionally relies on trial-and-error methodologies alongside the engineer's experience to generate "acceptable" manufacturing processes.
- **Clearpath Robotics** in Kitchener partnered with Siemens Canada and Conestoga College to develop an autonomous intelligent mobile forklift for advanced manufacturing. The project took the solution from proof of concept to full scale production and installation of the V1 Otto Lifter which has been demonstrated at several international trade shows.
- **Conrex Steel** in Toronto partnered with Macrodyne Technologies in Concord, ON, Source Industrial Services in Brampton, ON,

Toronto Metropolitan University, and George Brown College to build North America's largest and most sophisticated steel forming press, capable of advancing industrial fabrication of dished and formed steel used in assembling large pressure vessel tanks, spherical storage vessels, shipbuilding, and other large industrial structures. The 3,500 ton hydraulic press was commissioned in November 2021.

- **CrossWing** in Aurora, ON completed a project with ASC Canada in Toronto and researchers from York University to develop an AI-enabled quality control and predictive maintenance system based on the visual identification of defects. The solution has greatest commercial potential in the automotive and aerospace sectors.
- **Deep Cryogenics International** in Lunenburg, NS worked with Induspec in North Bay, ON, Lethbridge University and Red Deer and Canadore Colleges on a pilot project to manufacture a production-ready, scale-up deep cryogenic treatment tank (DCT) for use in the mining, power, marine and energy industries. The project helped introduce the first manufactured, industrial-use DCT tank in the world, create the only DCT tank capable of harnessing the technology for large size/economy-of-scale items, and has led to a made-in-Canada IP-protected product for domestic and export use. This breakthrough post-heat treatment technology simultaneously reduces wear, corrosion and material fatigue in metal alloys by 20-60% using a one-time, through-material process that is fast, inexpensive, environmentally friendly and permanent.
- **Distributive** in Kingston, ON partnered with Honeyvision in Nepean, ON to demonstrate the application of Distributive's remote data server modified to redirect on-premises latent compute resources towards new tasks to a machine vision system. The project showed that the solution was 13X less costly and significantly more efficient and secure than conventional cloud-based computing.
- **Guidebolt** in Mississauga, Candor Industries in Toronto, and researchers at Concordia University and Sheridan College completed a pilot project involving the use of humanoid telepresence robots for safer, more efficient, and consistent PCB manufacturing.
- **Hazelett CASTechnology ULC** in Kingston, ON and Aluminum Valley in Alma, QU worked together with researchers from Queen's

University, St. Lawrence and Loyalist Colleges to install and commercialize a new high-speed thin-strip twin belt demonstration/pilot to produce high quality aluminum alloy sheet at a fraction of the conversion cost and carbon footprint of conventional processes. The technology represents a new and transformative process and will position Canada as a world leader in the advanced aluminum manufacturing sector.

- **Intelligent City** in Vancouver and Brave Control Systems in Windsor completed a project to develop a robotic mass timber milling centre that is superior to existing technologies on the market. The solution will increase lumber throughput, lower lead times, increase quality, and reduce equipment downtimes by using robotics and digital twins to reduce the gap between design and manufacturing.
- **Interaptix** in Toronto undertook a pilot project with Gastops in Gloucester, ON to develop and deploy an augmented reality remote in-process inspection solution for discrete manufacturing. For high complexity discrete manufacturing processes that do not lend themselves easily to automation, the introduction of a remote spatial inspection platform offers opportunities for increased efficiency and accuracy, more effective training, and hiring from an expanded catchment area.
- **Linamar** partnered with PolyML, as well as ABB in Brampton, ON, Ferro Technique in Mississauga, and researchers from the National Research Council, Vector Institute, and Waterloo, Toronto, McMaster, and Western universities on a project to prove out Canada's capability to build an automated factory by mimicking an existing factory cell, but autonomously using the latest in advanced manufacturing technology. This cell will act as a pilot and proof of concept that can then be disseminated throughout Linamar's factories and, through its partners, to the rest of Canada's manufacturing ecosystem.
- **Linamar** also worked with the same research partners along with 2CM Automotive in Guelph and AIS Technologies in Windsor to develop an automated defect inspection system based on AI-enabled vision system technology.
- **Luxmux Technology Corp** in Calgary completed a pilot project with partners Dream Photonics in Vancouver and researchers from Laval, McGill, McMaster, Queen's, UBC, and Polytechnique de Montréal to scale up a manufacturing

process for integrating super-broadband super-luminescent diodes on silicon photonics.

- **Petra Hygienic Systems** in Concord, On, Sidac Automated Systems in Toronto, and a research team at the University of Toronto undertook a pilot project to develop and scale up an autonomous bottle/pump insertion solution that utilizes computer vision along with advances in machine learning, robotics, and mechanical engineering. The purpose of this project was to build new machine vision technology applied to COBOTs for randomized product selection. It led to significant improvements in automation efficiency, waste reduction, and quality control.
- **Pulsenics** in Toronto completed two projects based on its data analytic capabilities. The first was a feasibility study with BioLargo Water in Edmonton which allowed BIOlargo to improve the health and lifetime of their graphene electrodes. The second was a pilot with CERT Systems in Toronto and researchers from the University of Toronto that developed a process for non-disruptive monitoring of electrochemical activity to advance state-of-the-art ethanol production processes for the fuel industry.
- **Quali AI** in Kitchener successfully completed a feasibility study with Novo Textiles in Coquitlam, BC to validate a low latency tele-robotics solution for pick and place. The solution, which can be retrofitted on existing equipment, enables a remote operator to take over control of a robotic arm when the robot is unsure about how to complete a particular task, improving the speed of teleoperation of unstructured robotic tasks. This capability will allow manufacturers to increase productivity and

potentially outsource robotic teleoperations to a third party.

- **Ranovus** and Jabil Canada, both based in Kanata, ON, completed a project with research teams from McMaster and the University of Sherbrooke to develop a new process for Electro-Photonics Integrated Circuit (EPIC) manufacturing.
- **Sanctuary Cognitive Systems** in Vancouver worked with Dr. Christian Doherty Inc. also in Vancouver and Forcen in Toronto on a pilot project to develop an AI-enabled robotic hand with human-level dexterity for assembly operations. The objective was to develop a robotic hand to mimic the mechanical capability of a human hand for functional small part assembly and object manipulation, which is currently considered a technology barrier due to the lack of direct fingertip sensor feedback. The project fully integrated advanced control systems to allow for greater robotic dexterity and freedom of automation.
- **Smart Skin Technologies** in Fredericton, NB worked with Coca-Cola Bottling in Toronto on a study to assess the feasibility of a predictive maintenance pilot. The project led to three use cases using sensors, digital twins, and drone technology to demonstrate how equipment failures can be predicted and bottling line delays avoided.
- **Top Hat** in Kitchener partnered with Demtool in Petersburg, ON, Clear Software in Waterloo, and researchers from the University of Waterloo and Ontario Technical University in a pilot project to develop an automated end-of-production-line testing of its electric sidewalk robots in simulated winter weather conditions.



Enabling AI Solutions in Manufacturing

NGen defines Artificial Intelligence as algorithms or software systems that enable computers and machines to process and analyze data, recognize patterns, make decisions, and learn from experience. Functionally, we focus on smart systems that enable data analytics, prediction, autonomy, visualization, and human-machine collaboration. Our AI projects are based on the development, scale-up, and/or adoption of advanced manufacturing solutions that involve:

1. The application of algorithms or smart software systems to add value to products as well as to manufacturing and value chain processes, or
2. The application and integration of AI-enabled technologies and machines in manufacturing processes.

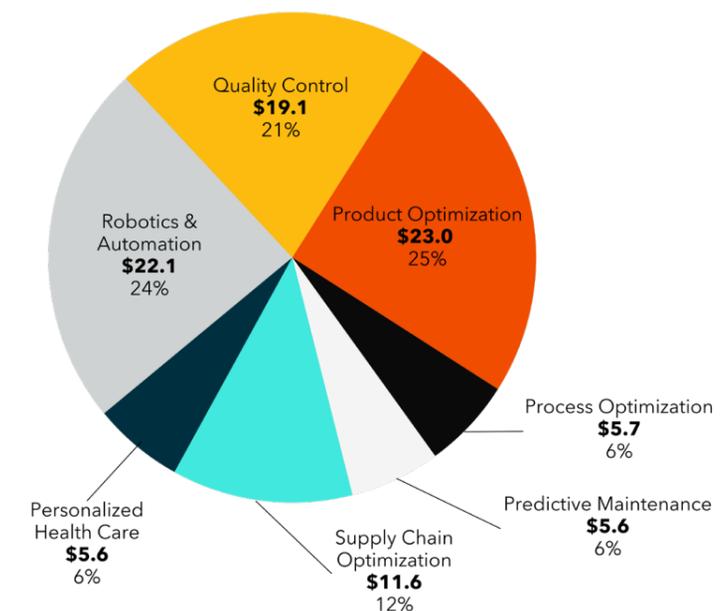
Of the 195 Technology Leadership projects that have been contracted to date (including the 165 projects that have been completed), NGen has approved investments of \$98.5 million in 73 projects involving discrete applications of AI. Our funding is leveraging an additional \$178.6 million in industry investments and has generated approximately \$3.6 billion in sales and IP licensing revenues to date. All of these projects involve

collaboration between Canadian companies providing AI solutions and manufacturers, and many involve other technology providers as well. (The count does not include applications like robotics and automation, vision systems, digital twins, or 3D printing in which AI is embedded in the operating system of the technology.)

Our projects have resulted in 41 (56%) solutions in the field of Machine Learning (ML), 30 (41%) in data analytics, and two (3%) in augmented reality. They have been applied to:

- Robotics and automation (19 or 26% of projects).
- Quality control (17 or 23% of projects).
- Production optimization (12 or 16% of projects).
- Process optimization (9 or 12% of projects).
- Predictive maintenance (7 or 10% of projects).
- Supply chain optimization (5 or 7% of projects).
- Personalized health care (4 or 5% of projects).

AI Applications in NGen Projects



NGenConnect, our own AI-enabled capabilities search engine, scrapes information about companies and other partner organizations in Canada's advanced manufacturing ecosystem, their product and services catalogues, as well as technology use cases from online public sources of information. The system contains information about 351 companies that have AI use cases. Among those AI solutions:

- 77% involve Machine Learning.
- 17% robotic process automation.
- 5% vision systems.
- 4% natural language processing.
- 1% Deep Learning.

Among the AI solution providers in NGenConnect, 66% are based in Canada while 34% are headquartered outside Canada although they

operate within the country. In terms of size, 66% are SMEs with fewer than 500 employees. (11% have fewer than 11 employees while 27% have fewer than 50.) Ten percent of companies have more than 1,000 employees.

NGen also provides funding support for Canada's AI4M cluster that focuses on encouraging the application of AI solutions in Canadian manufacturing. AI4M has 52 member organizations, consisting primarily of AI service providers, but also includes academic institutions and two AI innovation centres – Vector and AMII. In partnership with NGen, AI4M organizes online workshops for manufacturers to enhance their understanding of how AI can be applied to optimize operational and production processes and what the data, systems, and skills requirements are for successful implementation and deployment. The cluster also works with NGen to facilitate missions of Canadian AI solution providers to international advanced manufacturing shows like Hannover Messe.



Intellectual Property Strategy

NGen aims to maximize the commercial value, ecosystem impact, and the economic, environmental, and social benefits of intellectual property generated as a result of NGen investments, in Canada.

IP refers to intangible intellectual assets contributed to ("Background IP") or arising from ("Foreground IP") the projects and ecosystem development initiatives in which NGen invests. IP thus includes, but is not limited to, patents, trademarks, copyrights, industrial designs, software, algorithms, data, machine learning models, trade secrets, confidential information, and know-how.

NGen investments are determined according to the transformative and commercial potential of the foreground IP expected to be generated by individual projects, as well as the extent to which resulting commercial, ecosystem, economic, environmental, and other social benefits are expected to accrue within Canada. The objective of NGen investment is not the creation of IP itself, but the application of that IP to create value for Canadian businesses and for Canadians.

NGen maintains clear, transparent, and predictable IP ownership policies and licensing structures for the management of background IP applied in projects, treatment of foreground IP arising from projects, and processes by which NGen members can request and negotiate licenses to use foreground IP. Our policies, guidelines for treating IP contributed to and arising from projects, and collaboration agreement templates to assist project partners manage their IP relationships are posted on NGen's website along with calls for project proposals.

Our objective is to capture, retain, and maximize the value of project IP in Canada. To that end, project funding is contingent on demonstrating that the benefits of IP commercialization will accrue in Canada. NGen works with project partners to help them assess their freedom to operate, develop strategies to recognize and protect IP assets arising in projects, and put together plans to commercialize IP assets. We encourage project partners to make IP arising from projects available for licensing by other NGen members. IP assets available for licensing are posted on our IP Registry.

There were no changes in NGen's IP strategy last year. However, we have made some changes in

the way that we implement our IP strategy. We developed a template to help project participants structure their project's IP Plan and address salient issues related to IP management and commercialization and published an IP Guide providing insights on IP management in general and how it factors into project applications, contracting, and execution. We also integrated NGen's public IP Registry with ISED's ExploreIP platform.

NGen's IP Strategy operates as intended and continues to support the objectives outlined in our Five-Year Strategy and Corporate Plan. Our team of IP experts have by now helped consortia partners involved in 175 different projects develop strategies to protect and commercialize the IP arising from their projects. Their work has supported 380 SMEs, including 74 SMEs in 2023-2024. We also hosted three webinars on IP management over the past year, two for NGen members looking to develop advanced manufacturing and EV projects, and one on the topic of trade secrets which was open to NGen members as well as to the public. Thirty-one different SMEs attended the webinars which were subsequently posted as podcasts on NGen's YouTube channel with 583 subsequent downloads to date.

All contracted projects have agreed IP terms and conditions in their Master Project Agreements with NGen. There have been no cases in which project partners have been denied access to Foreground IP arising in their projects. Thirty-six projects closed in 2023-2024 in which all project partners refused to enter Foreground IP in NGen's IP Registry due to competitiveness concerns. There have been no disputes arising among project partners related to IP issues.

The following table summarizes the results of NGen’s IP strategy to the end of March 2024 across our entire project portfolio.

NGen IP Results

| | Results as of March 31st, 2024 | Change from March 2023 |
|---|--------------------------------|------------------------|
| IP Strategies developed for project partners | 175 | +26 |
| Background IP assets contributed to projects | 921 | +292 |
| Background IP assets shared with project partners | 672 | +165 |
| Foreground IP assets expected to be created by projects | 923 | +197 |
| IP assets created by projects | 1,747 | +1,013 |
| IP assets available in our IP Registry for sharing or licensing with other NGen members | 205 | +89 |
| Post-project licenses granted to NGen members | 472 | +302 |
| New companies created to commercialize IP and solutions arising in projects | 55 | +11 |



Data Strategy

NGen’s Data Strategy aims to maximize the value of the data collected by NGen for the benefit of Canada’s advanced manufacturing ecosystem and to support the financial sustainability of NGen. Our strategy determines how we acquire, store, govern, manage, use, and share data to accomplish our mission, achieve our strategic objectives, create value for our members and clients, carry out our operations, and ensure our long-term business success. Data privacy is a priority. NGen’s Data Strategy is posted on our website, as are our policies regarding:

- Privacy
- Data Use
- Member Data Use.

Our strategy is based on leveraging data as a strategic asset - focusing on business results, using data as a competitive advantage for NGen and its members, and supporting NGen’s strategic objectives. NGen has implemented robust operational, governance, and compliance processes to ensure data integrity, privacy, and security.

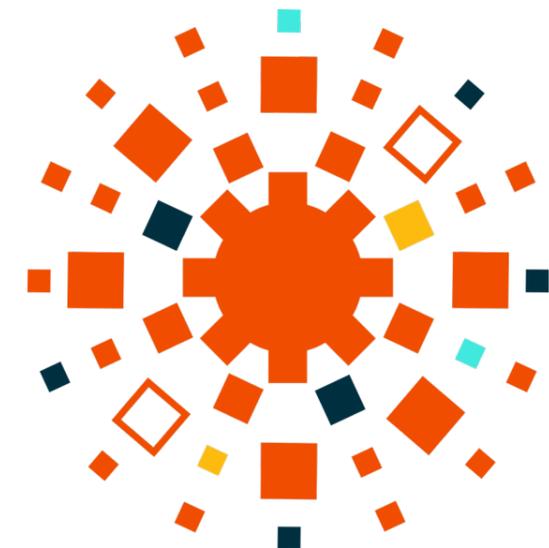
NGen’s Data, Information Technology, and Cybersecurity team is responsible for developing, implementing, and overseeing the policies and procedures related to the governance and management of data contained in and transferred into, out of, and between third party platforms and NGen’s corporate services IT stack. With respect to NGen’s internal management systems, all project application processes and NGen programs are administered online.

NGen continuously works to harden cybersecurity protection for the data we manage. We undertake regular third-party audits of our cybersecurity systems. Cybersecurity awareness training is provided to NGen staff on a bi-weekly basis. NGen also runs regular workshops for NGen members and other industry participants on cybersecurity. NGen is a member of Canada’s Cybersecurity Advisory Council (CSAC) and the Cybersecurity Working Group of the Canadian Centre for Cybersecurity (CCCS).

Our Data Strategy works as intended in support of the objectives in NGen’s Five-Year Strategy and Corporate Plan. There were no changes in our data strategy in 2023-2024.

In pursuit of our strategy last year NGen:

- Implemented a new online process for managing project information, including application intake, assessments, IP strategies, contracting, monitoring, and reporting that will help us consolidate data, improve project management efficiencies, and integrate project information into an enhanced CRM system.
- Developed an AI-enabled connections platform and solutions centre that will allow rapid identification of advanced manufacturing capabilities among NGen members and ecosystem partners.
- Hardened our cybersecurity defences. We raised our cybersecurity score by 10% in 2023, scoring 84% on MNP’s cybersecurity preparedness assessment. We also developed and provided staff training on our Business Continuity Plan in the case of a ransomware attack.
- Engaged with 30 SMEs as part of a cybersecurity collective enabling them to share intelligence about cyber-threats and best practices in cyber-risk mitigation related to advanced manufacturing.
- Implemented an automated due diligence process for sanctions compliance.



Impacts That Benefit Canadians

Leveraging Investments in Innovation

An important goal for NGen and the Global Innovation Clusters program is to leverage additional industry and public sector investments in research, development, and innovation.

- Total project funding approved by NGen is expected to generate an additional **\$443.7 million** in innovation spending, **152%** more than what NGen has committed.
- Projects funded under NGen's GIC Phase II and PCAIS funding will generate the greatest amount of investment leverage, raising contributions from industry and other investors expected to be 179% and 189% respectively of the amount of

Economic impacts

- NGen aims to generate \$15 billion in additional GDP and create 15,000 new jobs by 2028 as a result of the commercialization of the new products, processes, and IP arising from the projects that we fund. By the end of March 2024, NGen's completed projects had:
- Generated **\$7.0 billion** in new business revenues. This amounts to **32x** NGen's actual investments in those projects. Assuming 15% of that revenue will be recovered by the federal government (the average rate of federal taxation in Canada), NGen has already delivered a **4.8x**

Improving Productivity and Supply Chain Resiliency

In addition to generating new revenues for Canada's advanced manufacturing sector, NGen supports the development and adoption of new processes that lead to significant improvements in manufacturing productivity either through significant reductions in costs, materials, inventories, product development, equipment downtime, delivery times, defects, physical waste and other non-value-adding activities; through enhancements in agility, flexibility, quality, functionality, reliability, and customization; or by better methods of identifying, predicting, and mitigating market and supply chain risks.

Productivity improvements such as these are the basis for building advanced manufacturing capabilities that allow companies to respond rapidly to changing market conditions, pivot to manufacture new products to take advantage of new business opportunities, compete effectively in global markets, and grow their business internationally. They help to build resilience and secure supply chains in Canada

funding the projects received from NGen.

- The cumulative amount NGen invested in projects by the end of March 2024 totals **\$224.8 million**. These investments have been matched by **\$316.8 million** in additional contributions from industry and other funding sources.
- The 165 projects that were completed and closed by the end of March 2024 generated **\$310.3 million** in additional innovation investments. Sixteen of those projects were related to the production of critical products to address the COVID pandemic and did not require an industry match.
- return to the federal government and Canadian federal taxpayers from our investments!
- Directly created **3,449** new jobs, with **32,799** new direct and indirect jobs projected by 2028.
- Started up **55** new companies to commercialize their manufacturing solutions.
- Led to the development and commercialization of **205** leading-edge manufacturing processes.
- Granted **472 IP** licenses to other NGen members.

and cement the role of Canadian companies in global supply chains.

Over **83%** of NGen's projects identify productivity improvements as a key objective while 68% identify supply chain resiliency as a priority - with **45%** of projects aiming to support the localization of supply chains within Canada. Our projects that were intended to meet immediate critical shortages at the beginning of the COVID-19 pandemic and others that are part of NGen's Made Smarter Challenge aimed explicitly to establish globally competitive manufacturing processes in Canada to secure domestic supply of products required to fight the pandemic.

As a result, **79%** of project partners expect to see an improvement in overall operating efficiency while **75%** of project partners expect to see improvements in supply chain integration.

Health & Safety

Within NGen's portfolio **53** projects (25% of the total) explicitly aim to improve the health and safety of Canadians. The projects involve developing new manufacturing processes to produce personal protective equipment, test kits, therapeutics, medical devices, disinfectants and disinfecting robots, as well as other peripheral products crucial in health care supply chains. They include new manufacturing processes for medical devices and therapeutics to improve productivity and scale up production of new products, textile-based and digital monitoring solutions for patient care, as well as the development and use of new materials to support innovations in medicines, PPE,

Environmental Impacts

Projects that reduce energy and waste as a result of productivity improvements have a positive impact on the environment. So too do projects that enable the development of new materials to replace carbon-intensive products and processes, extract and process natural resources in a more environmentally friendly way, or support the development, scale-up, and adoption of new technologies that are critical to addressing the innovation challenges facing the electric vehicle industry and other cleantech sectors.

In terms of the environmental goals explicitly stated in the projects being funded by NGen:

- **75%** aim to have a positive environmental impact.
- **60%** will reduce GHG emissions.
- **57%** will improve resource processing efficiencies and reduce waste.
- **36%** will contribute to significant

Strengthening Equity, Diversity, and Inclusion

NGen is an active supporter of Canada's 50/30 challenge which aims to increase the representation and inclusion of diverse groups within Canadian workplaces. On our Board of Directors, our Chair, **two** of the four members of the Executive Committee, and **eight** of our 15 Directors are female. Among our employees, **49%** are female while 25% are from visible minority groups.

Among the 441 companies involved in the 194 projects completed or underway at the end of March 2024, **10%** are led by female CEOs, while **11%** of Board chairs, **25%** of Board members, and

and biomanufacturing. They also include major initiatives to support the development of advanced manufacturing ecosystems around nanomedicines, novel gene and cell therapies related to biomanufacturing, and supply chain resiliency.

Food security is closely related to health and safety. **Eight** projects in NGen's portfolio explicitly aim to improve the security of Canadian and global food supplies. They include projects that develop new manufacturing processes for high quality protein, improve productivity in the food processing industry, and enhance Canada's circular food economy by repurposing food waste to produce advanced materials.

improvements in air quality through reductions in emissions of particulates, nitrogen oxides, and volatile organic compounds.

- **42%** are using or creating new sustainable materials.
- **35%** will improve energy management and reduce GHG emissions as a result.
- **34%** will improve the environmental life cycle management of products.
- **20%** involve the circular reuse, recycling, and remanufacturing of materials and products.
- **17%** will support the development of zero-emission vehicles.
- **5%** aim to reduce land degradation.

NGen is particularly proud of the international recognition gained by one of its projects as a global top-ten AI application in support of the United Nation's sustainability goals.

28% of the members of their senior leadership teams are female.

Moreover, **25%** are led by CEOs from visible minority groups, **14%** of Board Chairs, **15%** of Board members, and **19%** of the members of their senior leadership teams are from visible minority groups. There is **one** Indigenous CEO.

Objectives for 2024-2025

NGen's Board of Directors has set six priority objectives in our Corporate Plan for 2024-2025

1. Enhance NGen's financial sustainability beyond 2028.
2. Approve \$40 million in GIC Phase II and PCAIS project funding.
3. Launch NGen's \$50 million Accelerated Homebuilding Initiative.
4. Play a leading role in facilitating Canada's industrial presence at Hannover Messe 2024 and 2025.
5. Support the commercialization of completed projects.
6. Continue to support Strategic Ecosystem initiatives that promote Canada's advanced manufacturing capabilities across Canada and internationally, build connections and collaboration across Canada's advanced manufacturing sector, attract more young people into advanced manufacturing, develop a more highly skilled, equitable, diverse, and inclusive advanced manufacturing workforce, and help manufacturers manage business and technology transformation including their transformation to net-zero facilities.



Measuring Impacts

Over the past year, Canada's Global Innovation Clusters have been collaborating with Innovation, Science, and Economic Development Canada (ISED) to develop a measurement approach that fully captures the impact of the Global Innovation Clusters program.

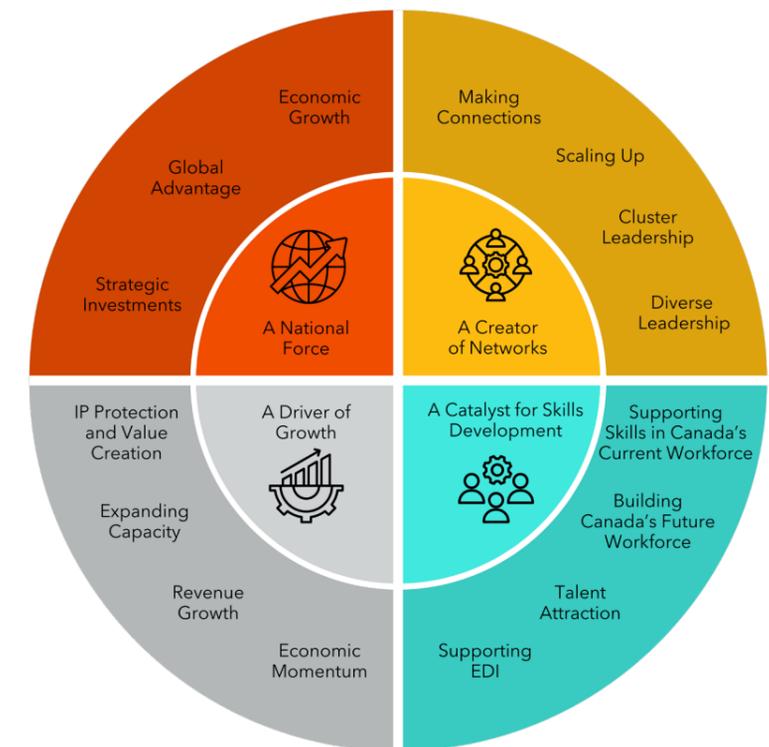
Together, ISED and the Clusters have co-designed a unique, made-in-Canada approach: the Innovation Cluster Ecosystem Impact Framework (ICEIF). This first iteration of the framework will continue to be refined and evolve as we work together to co-design a leading measurement framework.

The ICEIF is organized through a shared performance measurement architecture around the

Global Innovation Cluster program's four objectives with supporting segments (see diagram below). It is underpinned by Cluster Impact Frameworks and indicators organized around the shared architecture to reflect each Cluster's unique ecosystem.

While all Clusters share certain commonalities, the ICEIF model is tailored so that each Cluster can tell a performance story that best reflects their contribution and impact to Canada within a shared performance architecture. For more information, visit [Global Innovation Clusters](#).

NGen's Impact Framework consists of the following indicators.



Shared Program Objective: Creator of Networks

Expected Impacts:

- Making and strengthening connections
- Scaling up (Supporting SME performance)
- Cluster leadership
- Diverse leadership

Program-Wide Indicators:

- Average number of partner organizations to advanced projects
- Percentage of SME project partners that are high-growth firms
- Gender parity on Cluster Boards

NGen Indicators:

- Number of organizations registered on the NGen Connect collaboration platform
- Number and geographic scope of advanced manufacturing clusters in the NGenCan network

Shared Program Objective: Catalyst for Skills Development**Expected Impacts:**

- Building Canada's future workforce
- Talent attraction
- Supporting Equity, Diversity, and Inclusion

Program-Wide Indicators:

- Percentage of project partners employing equity-seeking groups

Shared Program Objective: Driver of Growth**Expected Impacts:**

- Expanding Capacity
- Revenue Growth
- Economic Momentum - Commercialization and job growth
- IP Protection and Value Creation
 - ◊ Supporting SMEs with IP

Program-Wide Indicators:

- Increase in technology readiness
- SME project partners' average revenue growth
- Number of direct, indirect, and induced jobs created and maintained over ten years
- IP measures
 - ◊ Commercializing funded IP
 - * Number and percentage of projects with foreground IP commercialized during and after the project
 - * Number of SMEs with an IP strategy developed through Cluster support
 - ◊ Protecting Canadian IP
 - * Number of formal IP rights created

- Number and location of international cluster partners
- Number of advanced manufacturing partnerships backed by formal agreements

- Percentage of project partners that are majority- or co-owned by equity-seeking groups

NGen Indicators:

- Number of participants in NGen talent attraction and job placement activities
- Number of individuals receiving skills training
- Number and new hires and training participants from equity-seeking groups

- * Number and percentage of projects with foreground IP owned by companies incorporated and operating in Canada
- * Number of licenses to foreground IP granted to third parties
- ◊ Supporting SMEs with IP
 - * Number and percentage of projects with IP to be used outside of project
 - * Number of individuals attending IP educational workshops
 - * Number of IP educational activities held

NGen Indicators:

- Revenue generated because of post-project sales and IP licenses
- Federal taxes generated per dollar of NGen investment
- Number and value of IP licenses granted
- Number of SMEs participating directly in international commercialization activities led by NGen

Shared Program Objective: National Force**Expected Impacts:**

- Economic growth
- Global advantage
- Strategic investments

Program-Wide Indicators:

- Total impact on GDP
- Percentage of SMEs that export
- Ratio of leveraged funding

NGen Indicators:

- Industry investment in and following NGen projects
- International investment attracted to Canada because of NGen activities
- Number of project partners by province and territory
- Percentage of projects with interprovincial collaboration



Statements and Affirmations for the Year ending March 31st, 2024

Ecosystem Investments

NGen invested \$30.8 million directly in support of ecosystem development initiatives in 2023-24, including \$11.3 million in industry-led Technology Leadership projects aimed at building research facilities, testbeds, and training for SMEs, \$14.6 million in our Future Ready advanced manufacturing workforce development program, \$0.4 million in our Additive Manufacturing Demonstration program, and \$4.5 million in Strategic Ecosystem initiatives that offer industry insights, connections, promotional and commercialization opportunities to SMEs, in addition to education, training, and management improvement programs for employees, students, and newcomers to Canada

Investment Policy

There have been no updates to NGen's investment policies, standards, and procedures.

Executive Compensation

Total compensation comprising salary and benefits for four employees was in excess of \$300,000 in 2023-2024.

Financial Controls

NGen management maintains a system of financial and internal controls to provide reasonable assurance that transactions are accurately recorded on a timely basis, are properly approved, and result in reliable financial information. NGen's financial and internal controls have operated as intended.

IP Strategy

NGen's IP Strategy has operated as intended and has supported the objectives as outlined in NGen's long-term strategy and Corporate Plan.

All contracted projects have agreed IP licensing obligations in their Master Project Agreements with NGen.

There have been no cases in which project partners have been denied access to Foreground IP arising in their projects.

In 2023-2024, 36 projects closed in which all partners refused to enter Foreground IP in NGen's IP Registry due to competitive concerns.

There have been no IP disputes arising among project partners that have been referred to dispute resolution.

Data Strategy

NGen's Data Strategy has operated as intended and has supported the objectives outlined in NGen's long-term strategy and Corporate Plan. No revisions to the strategy were undertaken over the past year.

Cybersecurity Protections

NGen tests its cybersecurity maturity annually. NGen has demonstrated a high-medium level of cyber security maturity and a low-medium level of residual risk. This year, NGen scored a rating of 84% in terms of implemented cybersecurity controls, indicating a high-medium level of maturity. NGen also undertakes regular staff training on cybersecurity threats and how to avoid them. As cyber threats continue to evolve, NGen will make further investments in staff training, processes, and technologies to mitigate and reduce the risk of exposure, particularly in high-risk areas protecting our networks and data.

Evaluations and Audits

NGen conducts regular reviews of its financial controls and project performance. NGen's financial statements for 2023-2024 were subject to independent financial audit. The results of the audit are appended at the end of this report. NGen's audited financial statements and auditors' report for 2023-2024 are appended in Annex 4.

Funding Sources for 2023-2024 (\$)

| Funding Sources | GIC Phase I | GIC Phase II | PCAIS | NQS | CSA | ESDC | NRC-IRAP | TOTAL |
|---|-------------------|-------------------|-------------------|---------------|----------|-------------------|----------------|--------------------|
| Direct Funding Contribution to Eligible Project Costs | 29,728,371 | 6,032,544 | 3,695,096 | - | - | 14,558,327 | 405,336 | 54,419,675 |
| Industry Contribution to Eligible Project Costs | 68,468,706 | 2,599,622 | 6,494,820 | - | - | 108,133 | - | 77,671,281 |
| Project Management Fees | - | 3,579,048 | 1,653,889 | 66,253 | - | - | - | 5,299,201 |
| Sponsorship & Other Fees | - | 531,507 | - | - | - | 2,575,500 | 94,664 | 3,201,671 |
| Other Government Contributions | - | - | - | - | - | - | - | - |
| Interest Income | - | 878,373 | 132,010 | 5,583 | - | 287,256 | - | 1,303,221 |
| Other | - | 72,546 | - | - | - | 555,815 | - | 628,361 |
| Total | 98,197,077 | 13,693,639 | 11,975,826 | 71,836 | - | 18,085,031 | 500,000 | 142,523,410 |

Contributions to Operating & Administrative Expenses 2023-2024

| Funding Source | Contributions in 2023-2024 | Contributions to Date |
|----------------|----------------------------|-----------------------|
| Industry | \$5,454,201 | \$16,421,862 |
| ISED | 7,713,419 | 39,811,601 |
| Other Sources | 5,608,465 | 7,759,812 |
| Total | \$18,776,084 | \$63,993,275 |

Financial Report for 2023-2024

| Type of Cost | Operating & Administrative Costs | Technology Leadership Project Costs | Ecosystem Development Program Costs | ESDC/IRAP | Total Costs |
|--|----------------------------------|-------------------------------------|-------------------------------------|---------------------|----------------------|
| Industry Contribution to Eligible Project Costs | \$11,728,248 | \$87,403,618 | \$4,503,843 | \$16,485,131 | \$120,120,840 |
| Unfunded Eligible Costs | - | 29,200,134 | 269,729 | - | 29,469,863 |
| Project Management Fees | - | 5,299,201 | - | - | 5,299,201 |
| Total | \$11,728,248 | \$121,902,953 | \$4,773,573 | \$16,485,131 | \$154,889,904 |

Industry Contributions for 2023-2024

| Funding Sources | GIC Phase I | GIC Phase II | PCAIS | NQS | CSA | ESDC | NRC-IRAP | TOTAL |
|--|---------------------|--------------------|--------------------|-----------------|----------|--------------------|-----------------|---------------------|
| Industry Contribution to Eligible Project Costs | \$68,468,706 | \$2,559,622 | \$6,494,820 | - | - | \$108,133 | - | \$77,671,281 |
| Project Management Fees | - | 3,579,048 | 1,653,899 | 66,253 | - | - | - | 5,299,201 |
| Sponsorship & Other Fees | - | 531,507 | - | - | - | 2,575,500 | 94,664 | 3,201,671 |
| Total | \$68,468,706 | \$6,710,177 | \$8,148,719 | \$66,253 | - | \$2,683,633 | \$94,664 | \$86,172,153 |

Annex 1: The People Who Powered NGen in 2023-2024

Board of Directors

Jennifer Maki
 Chair, Finance & Audit Committee
 Corporate Director

Mike Andrade
 Director
 CEO, Morgan Solar

Chris Brown
 Director
 Vice President
 GDLS Canada

Sandra Ketchen
 Director
 President & CEO
 Spectrum Health

Angela Pappin
 Director
 Chief Transformation Officer
 ArcelorMittal North America

Linda Hasenfratz
 Board Chair
 Executive Chair & CEO
 Linamar Corporation

Joris Myny
 Chair, Human Resources & Nominating Committee
 Senior VP, Digital Industries
 Siemens Canada

Mike Baker
 Director
 CEO, Wood Manufacturing
 Cluster of Ontario

Tony Chahine
 Director
 CEO, Myant

Carol McGlogan
 Director
 President & CEO
 Electro-Federation Canada

Michel Toutant
 Director
 Senior Partner
 Novacap

Michael Worswick
 University Observer
 Professor, Faculty of
 Engineering University of
 Waterloo

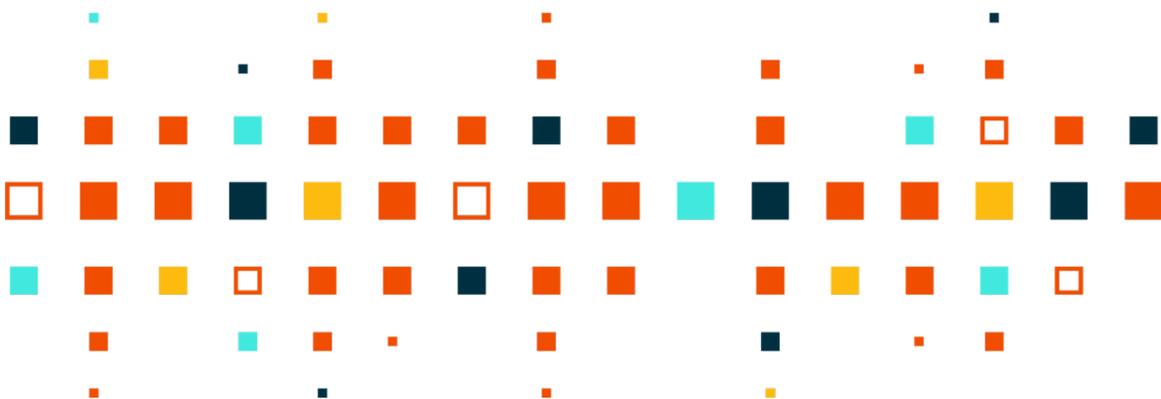
Tom Ferns
 Chair, Governance & Compliance Committee
 General Counsel & Privacy
 Officer
 Halton Healthcare

Rhonda Barnet
 Director
 CEO, Palette Skills

Lyne Dubois
 Director
 Corporate Director

Angela Mondou
 Director
 President & CEO
 Technation

Ben Rogers
 College Observer
 Dean of Innovation
 Seneca College



The NGen Team



Jayson Myers Chief Executive Officer
Bilal Haffejee Chief Financial Officer
John Laughlin Chief Technology Officer
Stewart Cramer Chief Manufacturing Officer



Wendy Young VP, Data Systems & Security
Rob Mastrotto VP, Projects
Jonathan Cutler VP, IP & Contracts
Stuart Kozlick VP, Strategy
Shelley J. Aubry HR Business Partner



Carol Cutrone Office Manager & EA
Christy Michalak Director, Manufacturing Development Programs
Bridget Bohan Director, Business Development
Robbie MacLeod Director, Strategic Communications
Frank Defalco Director, Member Engagement



Gillian Sheldon Director Investment Partnerships
Ken Morris Director, Digital Development Programs
Arthur Kong Director Project Development
Roshan Mohan Director Project Development
Stephanie Holko Director, Project Development



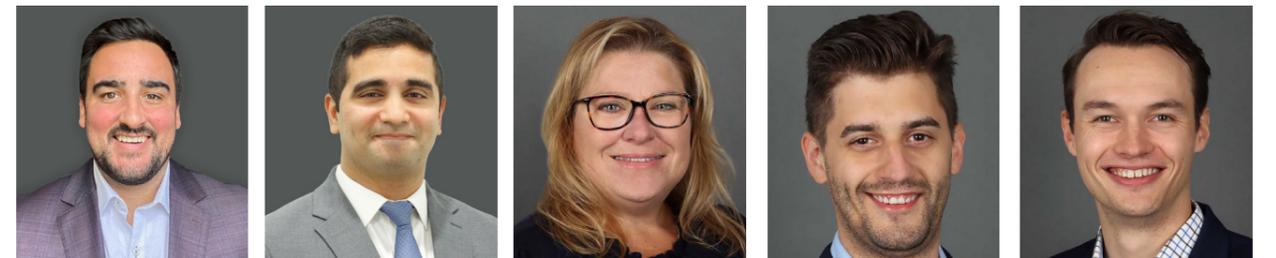
John F. Cigana Director, Project Development (Quebec)
Jérôme Lafrenière Director, Intellectual Property
Jeff Montag Director, Project Finance
Deborah Brintnell Financial Controller
Frank Haas Senior Manager, Program



Ron Pope Manager, Program
Stephen Pilkington Manager, Project
Joanne MacKinnon Senior Coordinator, Project
Mary Toth Manager, Contracts & Paralegal
Mélanie Stevan Manager, Contracts & Paralegal



Ashley Leung Manager, Financial Claims & Business Process
Nelson Netzereab Manager, Digital Marketing
Kim D'Souza Manager, Client Engagement
Nicole Mullings Manager, Data
Arun Lavishetty Manager, IT



Blake Helka Manager, Project Development
Aakash Rao Manager, Project Development
Tammy Smith Admin, Program Engagement
Adam Balogh Analyst, Cybersecurity Governance
Nicholas Pett Analyst, Business Systems



Kimberly Quines Coordinator, Marketing
Emily Blosdale Senior Analyst, Financial
Liana Biktimirova Analyst, Financial Claims
Parneet Kaur Analyst, Service Desk

Missing: **Beatrice Respall**, Analyst, Financial Claims

Annex 2: Technology Leadership Projects

Phase I Projects Closed by March 31st, 2024

| Project Lead | Short Title | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|--|--|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Pilot Projects | | | | | | | |
| KSL Lubricants Inc. | Pilot scale of Nanogel Lubricants, or Superabsorbent (SAC) Lubrication for the automotive stamping industry | 3 | 2 | 2 | 1 | \$76,304.24 | \$153,707.94 |
| Sanctuary Cognitive Systems Corporation | AI-enabled robotic hand with human-level dexterity for assembly | 3 | 3 | 3 | 0 | \$252,474.00 | \$517,357.56 |
| Panevo Services Limited | Real Time Overall Equipment Effectiveness Monitoring & Optimization | 2 | 2 | 2 | 0 | \$128,217.73 | \$256,435.46 |
| CG Belle Industries Inc. | Advancing Ablation Processes for Automotive Applications | 3 | 2 | 2 | 1 | \$29,618.50 | \$59,237.00 |
| DeepSight Réalité Augmentée Inc. | Module for digitalizing work instructions to augmented reality | 2 | 2 | 2 | 0 | \$126,203.58 | \$197,329.09 |
| TopHat | Development of automated end-of-production-line testing of 100% electric sidewalk robots in simulated winter conditions | 5 | 3 | 3 | 2 | \$178,208.64 | \$356,549.96 |
| Hazelett CASTechnology ULC | Hazelett CASTechnology ULC-High Speed Temperature Measurement for Aluminum Strip for Processing Line | 5 | 2 | 2 | 3 | \$197,465.48 | \$493,195.67 |
| AutoMetrics Manufacturing Technologies Inc. | Automated inspection system for robotic welding operations | 5 | 3 | 2 | 2 | \$181,287.49 | \$370,751.86 |
| Synaptive Medical Inc. | Manufacturing Process for MRI Gradient Coil Production | 3 | 2 | 1 | 1 | \$240,000.00 | \$848,414.59 |
| Deep Cryogenics International Inc. | A Deep Cryogenic Treatment Tank for Industrial Applications | 6 | 3 | 2 | 3 | \$215,867.63 | \$447,006.55 |
| Macrodyne Technologies Inc. | Automated Slitter Table Technology with Weight Compensation | 2 | 2 | 2 | 0 | \$106,944.86 | \$512,060.47 |
| Petra Hygienic Systems International Limited | Development and Implementation of an autonomous novel bottle/pump insertion solution that utilizes computer vision with advancements in machine learning, robotics and mechanical engineering. | 3 | 2 | 2 | 1 | \$249,981.50 | \$988,270.52 |
| CarbiCrete Inc. | Data Acquisition and Visualization Platform for the Manufacturing of Carbon-Negative Concrete | 3 | 2 | 2 | 1 | \$250,000.00 | \$512,503.18 |
| AIXEL Inc. | AIXEL AIoT Quality Inspection Automation | 4 | 3 | 2 | 1 | \$209,797.08 | \$420,482.06 |

| Project Lead | Short Title | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|--|--|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| ACQBuilt Inc. | The Development of a Robotic Solution for Building Component Prefabrication | 4 | 2 | 2 | 2 | \$244,677.24 | \$1,012,921.16 |
| Luxmux Technology Corporation | Manufacturing Process for integrated super-broadband superluminescent diodes on silicon photonics | 8 | 2 | 2 | 6 | \$195,110.14 | \$441,515.12 |
| Cosm Medical Corp. | Advanced manufacturing for novel medical consumables used in proprietary pelvic diagnostic imaging system | 5 | 1 | 2 | 4 | \$210,318.83 | \$420,637.66 |
| Electrovaya Inc. | Solid State Lithium Batteries | 6 | 2 | 2 | 4 | \$211,561.02 | \$423,122.04 |
| Interaptix Inc. | Deployment of an Augmented Reality Remote In-Process Inspection Solution in Discrete Manufacturing. | 2 | 2 | 2 | 0 | \$34,902.48 | \$77,490.96 |
| Axolotl Biosciences | Scaling up the manufacturing process for BrainPrint Bioink | 5 | 2 | 2 | 3 | \$105,866.66 | \$211,733.32 |
| Weber Manufacturing Technologies Inc. | Production and recycling of nickel materials for EV batteries via carbonyl technology | 3 | 2 | 2 | 1 | \$211,136.23 | \$429,772.46 |
| Ora Graphene Audio | First Canadian Graphene Commercial Supply Chain | 4 | 2 | 2 | 2 | \$160,155.43 | \$320,310.86 |
| Pulsenics Inc. | Non-disruptive monitoring of electrochemical activity to advance the state-of-the-art in electrolytic ethanol production processes | 3 | 2 | 2 | 1 | \$233,542.76 | \$472,224.41 |
| NetProCore Inc. | Digital Twin of the Aluminum Strip Casting Process via Computational Materials Science and Big Data Analysis | 6 | 3 | 3 | 3 | \$63,461.34 | \$128,986.86 |
| Brilliant Matters Organic Electronics Inc. | Reliable Supply of New Generation Organic Semiconductors | 5 | 2 | 2 | 3 | \$147,860.79 | \$295,721.58 |
| MicroGreen Solar Corp. | Mid-scale Battery Storage system with proactive SOH maintenance feature | 4 | 2 | 2 | 2 | \$55,934.27 | \$111,868.54 |
| Enertics Inc. | Online monitoring, diagnostics and predictive analytics of critical assets in food & beverage use-case | 6 | 2 | 2 | 4 | \$171,233.70 | \$342,467.40 |
| Mediphage Bioceuticals Inc. | Development of bacterial frameworks for biomanufacturing of industrial and therapeutic products | 4 | 2 | 2 | 2 | \$249,983.98 | \$535,604.31 |
| Kepstrum Inc. | New and Innovative End-of-Line Tester | 7 | 3 | 2 | 4 | \$161,538.80 | \$323,077.60 |
| ZS2 Technologies Ltd. | Made in Canada Magnesium TechTiles- Pilot Plant | 4 | 3 | 3 | 1 | \$214,172.13 | \$444,058.30 |
| Guidebolt Inc. | Humanoid Telepresence Robots for More Safe, Efficient, and Consistent PCB Fabrication | 4 | 2 | 2 | 2 | \$152,286.38 | \$368,433.82 |

| Project Lead | Short Title | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|---|--|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Dispersa Inc. | Biosurfactant Scale Up | 4 | 2 | 2 | 2 | \$189,858.85 | \$379,717.70 |
| Evercloak Inc. | Advancing large-scale graphene and thin-film membrane manufacturing | 4 | 2 | 2 | 2 | \$199,882.11 | \$503,057.86 |
| Molded Precision Components | Development and Testing of Cube Molding Methodology | 3 | 2 | 2 | 1 | \$239,213.00 | \$503,630.87 |
| Addem Labs Inc. | New PCB Manufacturing Process | 3 | 2 | 2 | 1 | \$249,912.01 | \$521,149.40 |
| Nano Cnet LTD. | Roll to Roll Continuous Printing of Transparent Conductors and Heaters | 4 | 2 | 2 | 2 | \$165,027.08 | \$347,544.08 |
| e-Zn Inc | Air Canada Pilot Production Line | 3 | 2 | 2 | 1 | \$250,000.00 | \$633,811.71 |
| Advanced BioCarbon 3D Ltd. | Pilot Scale Bio refinery - Replacing petrochemical plastics with 100% bio-based materials that perform as well | 4 | 3 | 2 | 1 | \$249,365.93 | \$502,668.25 |
| Graphite Innovation and Technologies Inc. (GIT) | Innovative Process to Produce Marine Coatings | 3 | 2 | 2 | 1 | \$249,416.00 | \$547,762.76 |
| Daxsonics Ultrasound Inc. | “Automated Manufacturing for Ultrasound Transducers used in Sterile Surgery “ | 3 | 2 | 2 | 1 | \$191,131.69 | \$403,922.85 |
| MEA Health Corporation | Advanced recycling technologies for single-use PPE | 3 | 2 | 2 | 1 | \$232,066.99 | \$498,644.92 |
| AEM Power Systems Inc. | Development of Gas Oscillation System for Superplastic Forming Process | 4 | 3 | 3 | 1 | \$216,137.41 | \$460,821.45 |
| Cosm Medical Corp. | 3D Printing and Semi-Automation of Advanced Manufacturing Processes for Patient-Specific Pessaries | 8 | 2 | 2 | 6 | \$246,312.50 | \$507,174.46 |
| Feasibility Studies | | | | | | | |
| AiimSense Inc. | Technology Feasibility Demonstration for Stroke Diagnosis | 5 | 2 | 2 | 3 | \$54,341.37 | \$140,624.87 |
| Quali Artificial Intelligence Inc. | AI powered Visual Quality Inspection | 4 | 4 | 4 | 0 | \$91,468.25 | \$183,444.96 |
| Kepstrum Inc. | Feasibility of a New and Innovative Production End-of-Line Tester | 3 | 2 | 1 | 3 | \$96,467.85 | \$276,105.70 |
| Apex Industries Product Development & Automation Group Inc. | Transformation of the Stone Veneer Panel Manufacturing and Installation Process | 2 | 2 | 2 | 0 | \$99,432.84 | \$208,250.30 |
| Exergy Solutions Inc. | Asphaltene Carbon Fiber Feasibility Study | 4 | 3 | 2 | 1 | \$81,835.00 | \$173,706.76 |
| Advanced BioCarbon 3D Ltd. | Bio-refinery Engineering Study | 3 | 2 | 2 | 1 | \$100,000.00 | \$228,600.68 |
| Datec Coating Corporation | Novel Clean Tech. Manufacturing Process for the Catalytic Production of a Green Disinfectant for Water Treatment | 5 | 2 | 2 | 3 | \$82,051.50 | \$173,421.68 |

| Project Lead | Short Title | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|--|---|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Geomega Resources Inc. (Innord) | Production of aluminum, iron and rare earths from bauxite residues | 2 | 2 | 1 | 0 | \$80,708.00 | \$261,997.28 |
| 3DBioFibR Inc. | 3D BioFibR Advanced Biofiber Manufacturing | 2 | 2 | 2 | 1 | \$74,293.50 | \$154,008.42 |
| USP Technologies | Development of a new manufacturing process for the recovery of value-added products from wastewater using advanced vacuum technologies | 5 | 4 | 1 | 1 | \$80,621.05 | \$194,813.70 |
| Quali Artificial Intelligence Inc. | Low latency tele-robotics for manufacturing pick and place | 2 | 2 | 2 | 0 | \$100,000.00 | \$203,626.74 |
| Cast Analytics Inc. | Development and Industrial Demonstration of Metal Casting Digital Twin with Integrated AI-Driven Optimization | 5 | 3 | 3 | 2 | \$96,213.00 | \$215,480.95 |
| Pulsenics Inc. | Real-time Condition Monitoring of Component Degradation for an Electrooxidation Water Treatment Process | 2 | 2 | 2 | 0 | \$99,958.91 | \$200,677.31 |
| Smart Skin Technologies | Weston Predictive Maintenance Pilot | 2 | 2 | 2 | 0 | \$83,900.00 | \$227,378.48 |
| USP Technologies Canada ULC | Towards a Canadian Circular Economy: Novel Manufacturing Processes for Iron-based Coagulants from Metal Wastes for Environmental Applications | 4 | 3 | 1 | 1 | \$80,524.77 | \$161,049.54 |
| Enerision Inc. | Feasibility Study of Manufacturing of Enerision’s Tri-Generation | 3 | 2 | 2 | 1 | \$68,254.64 | \$208,766.06 |
| Distributive | Distributive Computing | 2 | 2 | 2 | 0 | \$100,000.00 | \$219,045.09 |
| Lantern Machinery Analytics Inc. | Characterization of the Dimensionality of Two-Dimensional Nanomaterials | 5 | 2 | 2 | 3 | \$40,402.29 | \$85,785.29 |
| Cluster Building | | | | | | | |
| Wood Manufacturing Cluster of Ontario | Digital Transformation and Business Development | 4 | 1 | 1 | 3 | \$66,851.42 | \$133,702.84 |
| Saskatchewan Industrial and Mining Suppliers Association (SIMSA) | Digital Transformation and Business Development | 1 | 1 | 1 | 0 | \$71,100.15 | \$142,200.30 |
| NanoCanada | Digital Transformation and Business Development | 8 | 2 | 2 | 6 | \$67,191.36 | \$121,425.58 |
| Central Alberta: Access Prosperity | Digital Transformation and Business Development | 2 | 1 | 1 | 1 | \$75,000.00 | \$96,691.00 |
| Ontario Aerospace Council (OAC) | Digital Transformation and Business Development | 1 | 1 | 1 | 0 | \$74,993.32 | \$149,986.64 |
| Verschuren Centre Inc. | Digital Transformation and Business Development | 7 | 1 | 1 | 6 | \$74,992.50 | \$150,000.00 |

| Project Lead | Short Title | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|--|---|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Verschuren Centre Inc. | Digital Transformation and Business Development | 8 | 1 | 1 | 7 | \$73,345.48 | \$146,690.96 |
| Canadian Photonic Industry Consortium | Digital Transformation and Business Development | 1 | 1 | 1 | 0 | \$24,722.50 | \$53,738.00 |
| Canadian Association of Moldmakers, Inc | Digital Transformation and Business Development | 3 | 1 | 1 | 2 | \$75,000.00 | \$165,590.42 |
| Canadian Advanced Air Mobility | Digital Transformation and Business Development | 1 | 1 | 1 | 0 | \$71,850.95 | \$143,701.90 |
| InnoTech Alberta | Digital Transformation and Business Development | 6 | 1 | 1 | 5 | \$74,987.50 | \$152,453.44 |
| Canadian Association of PPE Manufacturers | Digital Transformation and Business Development | 5 | 1 | 1 | 4 | \$42,737.70 | \$85,475.40 |
| Reseau Trans-AI Inc. | Digital Transformation and Business Development | 4 | 1 | 1 | 3 | \$13,826.00 | \$27,652.00 |
| Destination AI | Digital Transformation and Business Development | 3 | 1 | 1 | 2 | \$14,034.65 | \$28,069.30 |
| Alliance of Manufacturers & Exporters Canada (NL Division) | Digital Transformation and Business Development | 3 | 1 | 1 | 2 | \$17,531.95 | \$35,063.90 |
| Indigenous Manufacturing & Contracting Network (IMCN) | Digital Transformation and Business Development | 2 | 1 | 1 | 1 | \$31,059.13 | \$62,118.26 |
| Canadian Additive Network (CAN) | Digital Transformation and Business Development | 4 | 1 | 1 | 3 | \$52,506.67 | \$137,398.63 |
| COVID-19 & Disinfecting Robot Challenge | | | | | | | |
| Sona Nanotech Inc. | Rapid Response Point-of-Care COVID-19 Virus Screening | 5 | 1 | 1 | 4 | \$3,896,295.31 | \$3,896,295.31 |
| Mosaic Manufacturing Ltd. | 45K COVID Shields | 4 | 4 | 4 | 0 | \$425,147.15 | \$428,952.06 |
| Response Biomedical Corp. | Pandemic preparedness COVID-19 test development & manufacturing scale-up | 1 | 1 | 1 | 0 | \$2,740,298.00 | \$2,900,397.57 |
| BOMImed Inc. | Ventilator Filters for COVID-19 Patients in Canada | 3 | 3 | 3 | 0 | \$925,603.67 | \$978,365.26 |
| Molded Precision Components | Shield-U | 3 | 2 | 2 | 1 | \$4,930,576.13 | \$4,932,740.91 |
| Precision Biomonitoring Inc. | Canadian Manufacture of Lyophilized SARS-CoV-2 RNA detection kits | 2 | 2 | 2 | 0 | \$4,551,388.45 | \$4,721,762.13 |
| DMF Medical Incorporated | Regulatory and Manufacturing Fast Track of memsorb™ - supporting the modification of anesthesia machines into ICU ventilators to deal with COVID-19 | 1 | 1 | 1 | 1 | \$276,007.50 | \$632,084.40 |

| Project Lead | Short Title | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|--------------------------------------|---|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Cloud Diagnostics Canada ULC | Cloud DX Pulsewave 2.0 Solution to COVID Hallway Medicine Crisis | 1 | 1 | 1 | 1 | \$1,756,325.00 | \$3,530,659.70 |
| Canadian Emergency Ventilators Inc. | Winnipeg Ventilator | 1 | 1 | 1 | 0 | \$5,000,000.00 | \$6,918,289.21 |
| ENVISION SQ INC. | Scaling-up Production of Next-Generation Self-Sterilization Coating | 2 | 1 | 1 | 2 | \$1,500,478.01 | \$1,738,492.76 |
| Burloak Technologies Inc. | 3D Printed Protective Fasemasks | 1 | 1 | 0 | 0 | \$1,137,856.77 | \$1,305,840.32 |
| Eclipse Automation Inc. | N95 Respirator Automation Project | 1 | 1 | 1 | 0 | \$2,106,775.00 | \$2,989,879.46 |
| Myant Inc. | Myant 2020 | 1 | 1 | 1 | 0 | \$2,489,771.00 | \$5,062,942.52 |
| GlobalDWS Corporation | GlobalDWS Disinfection Service Robot Solution | 1 | 1 | 1 | 0 | \$718,220.32 | \$1,493,656.56 |
| IPC Technologies/ Prescientx | Autonomous Mobile UV-Light Emitting Robotic Vehicle for Sanitizing Workplaces Against COVID-19 | 2 | 2 | 2 | 0 | \$687,444.54 | \$1,410,896.53 |
| A&K Robotics | DISINFECTION ROBOT - Amrud (Autonomous mobile robotic UV disinfectant) | 2 | 2 | 2 | 0 | \$608,583.18 | \$1,217,166.36 |
| Advanced Intelligent Systems Inc. | DISINFECTION ROBOT | 1 | 1 | 1 | 0 | \$944,600.29 | \$1,889,200.58 |
| Exacad Fabrication de moules inc. | Fast manufacturing of plastic injection molds for COVID-19 diagnostic and treatment | 1 | 1 | 1 | 0 | \$1,831,373.00 | \$1,965,950.47 |
| LuminUltra Technologies Ltd. | LuminUltra COVID19 RNA Test Kit | 1 | 1 | 1 | 0 | \$2,858,729.19 | \$4,610,853.52 |
| Immunovaccine Technologies Inc. | DPX-COVID-19: Manufacturing and scale up of neutralizing-epitope based synthetic | 3 | 1 | 1 | 2 | \$2,054,168.68 | \$4,108,337.36 |
| CrossWing Inc. | DISINFECTION ROBOT - CrossWing Cleanbot UV | 1 | 1 | 1 | 0 | \$1,599,905.0 | \$3,474,323.60 |
| Made Smarter Challenge | | | | | | | |
| Fidelity Machine and Mould Solutions | Automation of Procedure Mask Machines | 4 | 3 | 3 | 1 | \$890,902.70 | \$2,006,537.67 |
| Carmina de Young Fashion Design Inc. | Lifecycle PPE | 5 | 3 | 3 | 2 | \$1,994,409.00 | \$4,075,041.60 |
| The BIG-nano Corporation | Nanofiber Meltblown production using proprietary Canadian technology for PPE and Air Purification Filters | 6 | 5 | 5 | 1 | \$1,763,740.00 | \$3,592,351.27 |
| IPC Technologies/ Prescientx | Canadian N100 SuperMask - Breathing Is Believing | 5 | 2 | 2 | 3 | \$1,322,704.01 | \$3,066,384.07 |
| Novo Textile Company Ltd. | Automated Original Equipment Fabrication for N95 Mask Production | 2 | 2 | 2 | 0 | \$770,387.55 | \$1,946,356.46 |

| Project Lead | Short Title | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|---|--|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Titan Clean Energy Projects Corporation | Biodegradable melt-blown resin and fabric production | 5 | 5 | 4 | 4 | \$898,140.00 | \$1,929,655.58 |
| Fine Cotton Factory Inc. | Advanced Manufacturing Scale-up for Metal-Infused Antimicrobial Textiles | 6 | 2 | 2 | 4 | \$1,390,851.99 | \$3,142,719.51 |
| McRae Imaging Inc. | Antimicrobial Shielding of Shared Spaces with Nanomaterial Coatings | 4 | 3 | 3 | 1 | \$1,743,058.77 | \$3,976,659.65 |
| International Point of Care Inc. | ADVANCED MANUFACTURING EXPANSION FOR LARGE-SCALE COVID-19 REAGENTS AND TEST KITS | 4 | 4 | 3 | 0 | \$2,083,723.07 | \$5,771,241.13 |
| Molded Precision Components | Automated Sanitizer Advanced Manufacturing System - Pellet to Pallet. | 5 | 2 | 2 | 3 | \$4,772,292.85 | \$9,648,997.16 |
| Armfoam Inc. | Automated production of N95 Respirators | 2 | 2 | 2 | 0 | \$2,441,034.03 | \$5,677,433.07 |
| Providence Therapeutics Holdings Inc. | A Made-In Canada COVID-19 mRNA Vaccine | 2 | 2 | 2 | 0 | \$5,050,000.01 | \$10,930,020.66 |
| Automotive Zero-Emission Manufacturing Challenge | | | | | | | |
| Cnem Corporation | Green Recycling of EV Battery Black Mass | 5 | 3 | 3 | 2 | \$143,349.91 | \$317,957.82 |
| Calogy Solutions | T-Man | 6 | 2 | 2 | 4 | \$787,029.56 | \$1,574,742.52 |
| Damon Motors Inc. | AI-Assisted Smart-Optic Manufacturing of Modular EV systems | 5 | 3 | 3 | 2 | \$2,180,266.05 | \$4,360,532.10 |
| Rayleigh Solar Tech Inc. | Development of scalable manufacturing processes for solar film integrated body panels | 7 | 2 | 1 | 5 | \$220,700.47 | \$522,614.27 |
| Momentum Materials Solutions Corp. | Development of Next Generation Membrane Electrode Assembly Using Novel Nanoporous Carbon Materials for High Performance Polymer Electrolyte Membrane Fuel Cell | 3 | 2 | 2 | 1 | \$413,022.29 | \$947,390.82 |
| Linamar | Compact Inverter Manufacturing | 3 | 2 | 1 | 1 | \$3,347,419.2 | \$7,018,729.56 |
| Ballard Power Systems Inc. | Next Generation Grafoil Plate Forming Pilot Line | 3 | 3 | 1 | 0 | \$3,177,788.56 | \$6,561,314.08 |
| Precision Resource Canada Ltd. | Scale-up to Commercialization of Metallic Bipolar Plates for Fuel Cell Road Vehicles using Advanced Manufacturing in Canada | 4 | 2 | 2 | 2 | \$3,996,891.10 | \$8,880,265.78 |
| Hydrogenics Corporation | Establish CoE for HVM of HFCs for HDCV to realize Canada's GHG & Net-Zero emissions target by 2030 & 2050 | 8 | 4 | 4 | 4 | \$3,387,027.44 | \$7,273,861.83 |
| Electrovaya Inc. | Next Generation NMP-free Cell | 4 | 3 | 3 | 1 | \$489,219.21 | \$1,129,248.42 |
| Ventra Group Co | Advanced Manufacturing Methods for Electric Vehicle Propulsion Batteries | 8 | 2 | 1 | 6 | \$3,168,775.59 | \$7,308,026.17 |

| Project Lead | Short Title | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|--|--|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Li-Metal Corp. | Recycling of Solid-State Lithium metal Batteries for EV Powertrains | 2 | 2 | 1 | 0 | \$2,300,015.96 | \$5,673,064.91 |
| Electrovaya Inc. | Automated Module Assembly with Advanced Laser Welding and In-line QC Methods | 3 | 2 | 2 | 1 | \$969,820.36 | \$2,028,345.68 |
| Summit Nanotech Corporation | Manufacturing denaLi C Green Lithium Extraction Modules | 3 | 2 | 2 | 1 | \$3,912,434.73 | \$8,872,435.01 |
| Open Call Advanced Manufacturing Projects | | | | | | | |
| Formula Solutions Inc. | Integrating automation for scale up of carbon fibre cascade production | 6 | 3 | 3 | 3 | \$3,241,409.23 | \$10,050,419.98 |
| Ranovus Inc. | Process development for Electro-Photonics Integrated Circuit (EPIC) Manufacturing | 7 | 2 | 1 | 5 | \$3,108,052.31 | \$7,000,117.91 |
| Axiom Plastics Inc. | Zero Transition | 8 | 4 | 4 | 4 | \$623,278.36 | \$1,405,630.10 |
| Clearpath Robotics Inc. | OMEGA - A Canadian Built, Autonomous, Intelligent Mobile Forklift for Advanced Manufacturing | 3 | 2 | 1 | 1 | \$657,169.00 | \$2,613,911.34 |
| Baxter Corporation | Optimizing Medical Device Remanufacturing Process | 3 | 3 | 2 | 0 | \$526,672.10 | \$1,222,737.37 |
| Mycionics Inc. | Mycionics robotic mushroom harvester | 4 | 3 | 3 | 1 | \$1,460,418.38 | \$4,414,411.42 |
| Panevo Services Limited | Real Time Asset Monitoring, Optimization & Food Processing Supply Chain Collaboration | 5 | 3 | 2 | 2 | \$1,383,422.04 | \$4,509,483.67 |
| MacDonald, Dettwiler and Associates (MDA) Corporation | Advanced manufacturing for highly adaptive manufacturing environments | 7 | 3 | 2 | 4 | \$4,724,885.27 | \$10,722,824.03 |
| Myant Inc. | New Advanced Manufacturing Production Environment for Smart Textiles as Medical Devices | 9 | 4 | 4 | 5 | \$5,341,479.54 | \$12,414,451.44 |
| Apera AI Inc. | 3D Vision Guided Robotic Assembly | 6 | 2 | 1 | 4 | \$508,264.82 | \$1,230,920.57 |
| Macrodyne Technologies Inc. | Bioplastic as an alternative to single-use plastics | 5 | 4 | 4 | 1 | \$3,010,359.40 | \$6,948,075.17 |
| Evercloak Inc. | Scaling up graphene-based membrane manufacturing and sustainable manufacturing of net-zero energy cleanrooms | 8 | 2 | 2 | 6 | \$1,459,683.05 | \$3,425,898.45 |
| Stronach Centre for Innovation, a division of Magna International Inc. | Autonomous Adaptable Robot System | 5 | 2 | 1 | 3 | \$1,290,749.49 | \$3,074,534.47 |
| Universal Matter Inc. | Large Scale Industrialization of the "Flash Joule Heating" Graphene Manufacturing Process | 5 | 3 | 2 | 2 | \$1,938,343.13 | \$4,365,637.68 |

| Project Lead | Short Title | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|--|--|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Imperial Mining Group | A Vertically Integrated Canadian Ecosystem for the Production of Novel Scandium Aluminum Alloys for 3-D Printing | 4 | 2 | 2 | 2 | \$572,257.58 | \$1,580,976.25 |
| ReDeTec Inc. | MixFlow Advanced AI Plastics Processing and Recycling | 5 | 2 | 2 | 3 | \$336,142.28 | \$757,077.17 |
| CrossWing Inc. | Quality Control and Predictive Maintenance with AI/ML | 3 | 2 | 2 | 1 | \$1,257,994.08 | \$3,283,197.58 |
| McGuire Aero Propulsion Solutions Inc. | Micro-Power-Plant Advanced Manufacturing Demonstrator | 3 | 2 | 2 | 1 | \$456,653.55 | \$1,069,924.63 |
| Reaction Dynamics Lab Inc. | Development of large-scale additive manufacturing capabilities for next-generation, eco-friendly hybrid rocket engines | 4 | 2 | 2 | 2 | \$1,088,897.63 | \$2,452,472.21 |
| Intelligent City Inc. | Robotic Mass Timber CNC Processing Center | 2 | 2 | 2 | 0 | \$814,063.75 | \$1,905,626.44 |
| ThinkData Works Inc. | Driving Advanced Manufacturing Practices Through Supply Chain Resiliency Analytics | 5 | 3 | 1 | 2 | \$3,330,000.01 | \$8,070,384.73 |
| IVEXSOL Canada Inc. | Commercialization of a next generation, advanced lentiviral vector manufacturing platform | 3 | 3 | 2 | 0 | \$285,253.91 | \$797,024.57 |
| Orthopaedic Innovation Centre Ltd. | Development and Validation of Automated Patient Specific Medical Device Software for Improved Additive Manufacturability | 9 | 5 | 5 | 4 | \$2,068,519.21 | \$4,658,827.77 |
| Conrex Steel Ltd. | Advancing Large Steel Press Technology | 5 | 3 | 3 | 2 | \$3,437,922.59 | \$7,904,247.66 |
| Mosaic Manufacturing Ltd. | Array Additive Manufacturing Production System (ARRAY) | 5 | 5 | 5 | 0 | \$3,480,844.44 | \$8,126,296.32 |
| Aspire Food Group Canada Ltd. | Novel Application of Advanced Manufacturing Approaches to High Quality | 11 | 5 | 4 | 6 | \$15,957,687.84 | \$82,130,744.59 |
| Marwood International Inc. | TaComp: Global First Advanced Process for Lightweight Part Manufacturing | 5 | 3 | 1 | 2 | \$1,957,662.30 | \$4,618,849.84 |
| Polyalgorithm Machine Learning | Zero Downtime, Zero Defects and Output Optimization | 2 | 2 | 1 | 0 | \$858,258.21 | \$2,328,565.29 |
| OmniaBio Inc. | Global Leadership in Life Sciences by Enabling Commercial Scale Manufacture of Cell & Gene Therapies. | 14 | 5 | 5 | 9 | \$10,543,346.30 | \$30,665,373.88 |
| Linamar | Automated Manufacturing Development | 9 | 3 | 2 | 6 | \$974,470.26 | \$2,315,249.12 |

| Project Lead | Short Title | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|---------------------------------------|--|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Linamar | Automated Defect Inspection | 9 | 3 | 1 | 6 | \$1,169,982.7 | \$2,775,938.53 |
| Polar Sapphire Ltd. | Advanced Systems for High Purity Alumina (HPA) Production | 7 | 3 | 3 | 4 | \$2,176,794.61 | \$5,114,886.61 |
| Genecis Bioindustries Inc. | Transforming Food Waste Anaerobic Digester into a Bioplastic Manufacturing Hub | 5 | 2 | 2 | 3 | \$2,628,735.96 | \$5,999,360.51 |
| Mosaic Manufacturing Ltd. | Vector Mass Production Metal 3D Printing System | 5 | 3 | 3 | 2 | \$3,545,772.07 | \$8,028,056.64 |
| Novonix battery testing services Inc. | Cathode Material Development and Pilot Manufacturing Line | 3 | 2 | 2 | 1 | \$1,295,878.84 | \$13,417,039.18 |
| CarbiCrete Inc. | Industrial Implementation of CarbiCrete's Carbon-Negative Concrete Manufacturing Process at Patio Drummond | 4 | 3 | 3 | 1 | \$3,436,560.00 | \$7,740,000.00 |
| Ventra Group Co. | Flex-Ion Advanced Battery Innovation Center - Advanced Manufacturing Research - Project Tau | 7 | 2 | 1 | 5 | \$3,366,195.22 | \$7,826,343.81 |
| Verschuren Centre | National Bio-Manufacturing Ecosystem | 2 | 2 | 2 | 0 | \$1,860,227.2 | \$5,750,603.20 |
| ArcelorMittal Dofasco | Digital Transformation of Secondary Metallurgy Facility at ArcelorMittal Dofasco | 7 | 4 | 2 | 3 | \$4,056,331.37 | \$9,784,476.87 |
| Exergy Solutions Inc. | Advanced manufacturing applications in mining and mineral processing- TA0027 | 11 | 3 | 2 | 8 | \$3,361,287.98 | \$7,772,420.60 |

Phase II Projects Approved and Underway as of March 31st, 2024

| Project Lead | Short Title | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|--|---|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Advanced Manufacturing Projects | | | | | | | |
| 3D BioFibR Inc. | Recombinant Collagen Fiber Manufacturing Consortium | 2 | 2 | 2 | - | \$1,263,657.80 | \$3,596,263.00 |
| AEM Power Systems Inc. | Gas Oscillation Superplastic Forming Technology Full Demonstration | 2 | 2 | 2 | - | \$2,904,426.37 | \$7,849,801.00 |
| Canadian Innovative | PTAAM Robotic Additive Manufacturing System | 5 | 3 | 2 | 2 | \$2,960,000.00 | \$8,000,000.00 |
| Carbicarete | Implementing CarbiCrete's Cement-Free Concrete Technology at Canal Block | 2 | 2 | 2 | - | \$2,960,000.00 | \$8,301,977.00 |
| CCRM (Centre for Commercialization of Regenerative Medicine) | Enabling Advanced Therapeutics & Domestic Supply Chain for Biomanufacturing | 6 | 6 | 4 | - | \$2,960,000.00 | \$8,000,003.00 |

| Project Lead | Short Title | Project Partners | | | | NGen Investment | Total Investment |
|---------------------------------|--|------------------|----------|------|----------|-----------------|------------------|
| | | Total | Industry | SMEs | Research | | |
| FPS Food Process Solution Corp. | Transformative and Fully Integrated Digital Solution for Food Manufacturing | 3 | 3 | 3 | - | \$1,085,540.66 | \$2,933,894.00 |
| Geomega Resources Inc. | Recycling and production of Rare-earth oxides from permanent magnet scrap | 2 | 2 | 2 | - | \$2,959,999.98 | \$8,000,016.00 |
| Mosaic Manufacturing Ltd. | Micro-Factory Deployment and Integration Project (MDIP) | 3 | 3 | 3 | - | \$2,951,324.00 | \$7,976,518.00 |
| Nfinite Nanotechnology Inc. | High-Throughput Roll-To-Roll Spatial Atomic Layer Deposition | 2 | 2 | 2 | - | \$2,954,913.00 | \$7,996,251.00 |
| Octane Orthobiologics Inc | Advanced Biomanufacturing of Cartilage Implants using Cocoon Automation | 3 | 2 | 2 | - | \$2,884,263.22 | \$7,795,305.92 |
| Orthopaedic Innovation Centre | Metal Additive Manufacturing of Next-Gen Biomedical Lattice | 3 | 3 | 3 | - | \$995,094.65 | \$2,689,445.00 |
| OSCPS Motion Sensing Inc. | Scaling of Autonomous Navigation Sensors through Photonic Wirebonding | 2 | 2 | 2 | - | \$716,798.05 | \$1,937,291.50 |
| Panevo Services Limited | Advanced Production Scheduling Optimization System | 2 | 2 | 1 | - | \$1,095,333.99 | \$2,960,403.00 |
| Petra Hygienic Systems | Lights Out fully autonomous end to end flexible system enabled by AI & robotics | 3 | 3 | 3 | - | \$1,142,659.79 | \$3,088,286.00 |
| Precision Resource Canada Ltd. | Advanced Tool Manufacturing for Critical Hydrogen Fuel Cell Components in Canada | 2 | 2 | 2 | - | \$2,960,000.00 | \$8,000,000.00 |
| Price Industries Ltd. | Discrete Manufacturing Assembly Transformation | 3 | 3 | 2 | - | \$2,959,968.59 | \$7,999,637.00 |
| ZS2 Technologies | Canadian Magnesium Cement Boards | 5 | 5 | 4 | - | \$695,413.41 | \$1,880,010.25 |

Phase II Projects Approved but not yet Announced as of March 31st, 2024

| Type of Project | # Projects | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|-----------------------------------|------------|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Zero-Emission Vehicle Value Chain | 5 | 59 | 59 | 50 | - | \$13,047,404.00 | \$38,844,432.00 |

Pan Canadian AI Strategy Approved and Underway as of March 31st, 2024

| Project Lead | Short Title | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|--------------------|--|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Apera AI Inc. | High Speed AI Powered 3D Inspection | 2 | 2 | 1 | - | \$1,570,007.9 | \$4,885,737.00 |
| Ayrton Energy Inc. | Using AI to Fast-Track Electrochemical Technology Developments | 2 | 2 | 2 | - | \$1,650,224.10 | \$4,714,926.00 |

| Project Lead | Short Title | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|--------------------------------------|--|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Ballard Power Systems Inc. | Next Generation Factory Acceptance Test | 2 | 2 | 1 | - | \$1,118,895.05 | \$3,196,843.00 |
| Basetwo Artificial Intelligence Inc. | AI-driven digital twins to accelerate and enhance life science manufacturing | 4 | 4 | 4 | - | \$1,516,623.15 | \$4,333,209.00 |
| Cosm Medical Corp. | Use of AI in Manufacturing of Patient-Specific Gynethotic Device | 4 | 4 | 3 | - | \$1,202,804.90 | \$3,433,750.00 |
| Keirton Inc. | AI/Machine Vision Quality Control | 2 | 2 | 1 | - | \$1,234,473.1 | \$3,527,066.00 |
| Kinova Inc. | Smart, Connected and Collaborative Canadian Robotic Framework | 4 | 4 | 3 | - | \$2,588,599.25 | \$7,410,999.00 |
| Lantern Machinery Analytics Inc. | A Flexible, Scalable AI Manufacturing Quality System | 2 | 2 | 2 | - | \$1,219,239.70 | \$3,483,542.00 |
| Linamar Corporation | AI-enabled Autonomous Manufacturing Equipment | 2 | 2 | 1 | - | \$1,579,830.00 | \$4,513,800.00 |
| Linamar Corporation | Enhanced AI Traceability for Manufacturing | 2 | 2 | 1 | - | \$1,026,515.70 | \$2,932,902.00 |
| Mosaic Manufacturing Ltd. | Digital Manufacturing Production AI Engine (Vertex3D-AI) | 3 | 3 | 3 | - | \$2,152,500.00 | \$6,150,000.00 |
| Promise Robotics | An AI-Enabled Robotic Solution for Building Component Prefabrication | 2 | 2 | 2 | - | \$2,207,520.00 | \$6,547,200.00 |

National Quantum Strategy Projects Approved and Underway as of March 31st, 2024

| Project Lead | Short Title | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|--------------------|-----------------------------------|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| OTI Lumionics Inc. | Quantum Simulations for Materials | 2 | 2 | 2 | - | \$1,250,000 | \$2,032,588 |

National Quantum Strategy Projects Approved but not yet Announced as of March 31st, 2024

| Type of Project | # Projects | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|---|------------|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Quantum Applications in Manufacturing and Manufacturing for Quantum | 3 | 7 | 7 | 7 | - | \$4,353,200 | \$10,000,137 |

Moonshot for Mining, Materials, & Manufacturing Projects Approved but not yet Announced as of March 31st, 2024

| Type of Project | # Projects | Project Partners | | | | Actual NGen Investment | Actual Total Investment |
|--|------------|------------------|----------|------|----------|------------------------|-------------------------|
| | | Total | Industry | SMEs | Research | | |
| Solutions for Lunar In-Situ Resource Utilization | 7 | 14 | 14 | 14 | - | \$2,544,504 | \$5,089,189 |

Annex 3: Additive Manufacturing Demonstration Projects 2023-2024

| Lead Company | Service Provider | Lead Company | Service Provider |
|--------------------------|---------------------------------|------------------------|------------------------------|
| 3D Space Terraform | Red Deer Polytechnic | Myant | Axis Prototype |
| AeroRecip | PADM | Nada Cycles | Canadore College |
| Alstom | Axis Prototype | Nanogrande | Nanogrande |
| Apollo Machine | Apollo Machine | Nemak | Burloak |
| Aro Robotic Systems | Sarcomere | Nexans | Azis Prototype |
| Bell Helicopter | Nanogrande | NURO | Custom Prototype |
| Biome Renewables | Nova Scotia Community College | Onstream | PADM |
| Biosa | Lacite College | OptiFab | OptiFab |
| Canadian Additive | Jesse Garant Ass. | PADM | PADM |
| Carbon Upcycle | Red Deer Polytechnic | Pantheon Design | Pantheon Design |
| Chrysalabs | Nanogrande | PlaEx | University of Waterloo |
| Conception | Axis Prototype | Polycontrole | Polycontrole |
| Cosm Medical | Mosaic | Press Lock | Additive Metal Manufacturing |
| Custom Prototype | Custom Prototype | PWC | PADM |
| Delkotech | Additive Metal Manufacturing | RF Wireless | Additive Metal Manufacturing |
| Divergent/Gbatteries | Mosaic | Rogue Solutions | PADM |
| Dominis | Apollo Clad | Roswell DHT | PADM |
| Dunedin Energy | PADM | Sarcomere | Additive Metal Manufacturing |
| Duxion | Tronos | Skytrac | Canadore College |
| Eagle Aerospace | Exergy | Solar Earth | Custom Prototype |
| Elementiam | Centre de Métallurgie du Québec | Solarstream | Exergy |
| Martinrea | Equishpheres | Sparrow Downhole Tools | Exergy |
| Exergy | Exergy | Speherical Rotors | Exergy |
| Fingerprint Technologies | Forgelabs | Spinduction | Agile |

| Lead Company | Service Provider | Lead Company | Service Provider |
|----------------------|---------------------------------|--------------------------|---------------------------------|
| Gastops | PADM | Spinologics | PADM |
| GE | PADM | StimStixx | Additive Metal Manufacturing |
| General Conveyor | Additive Metal Manufacturing | Suncor | PADM |
| Howmet | Axis Prototype | Suncor | Polycontrole |
| Illuminix AI | Innotech Alberta | Suncor | Rapidia |
| Jackalope Bikes | Additive Metal Manufacturing | TEKAD | Centre de Métallurgie du Québec |
| Kanata Energy | PADM | Tekna | Burloak |
| Liberty Springs | Université du Québec à Rimouski | Tesla | Additive Metal Manufacturing |
| Maya HTT | Maya HTT | Top Grade Molds | Additive Metal Manufacturing |
| MDA | Burloak | Vanquish Hockey | Centre de Métallurgie du Québec |
| Messen Furniture | Exergy | Voltera | Voltera |
| Mirador Design | Nanogrande | Wishmedia - Fern & Petal | Forgelabs |
| MSLR Electric E-Foil | Burloak | Zero Point Cryogenics | University of Alberta |

Annex 4: Audited Financial Statements for 2023-2024



KPMG LLP
Commerce Place
21 King Street West, Suite 700
Hamilton, ON L8P 4W7
Canada
Telephone 905 523 8200
Fax 905 523 2222

Financial Statements of

NEXT GENERATION MANUFACTURING CANADA

And Independent Auditor's Report thereon

Year ended March 31, 2024

INDEPENDENT AUDITOR'S REPORT

To the Shareholder of Next Generation Manufacturing Canada

Opinion

We have audited the financial statements of Next Generation Manufacturing Canada (the Entity), which comprise:

- the statement of financial position as at March 31, 2024
- the statements of operations and changes in net assets for the year then ended
- the statement of cash flows for the year then ended
- and notes to the financial statements, including a summary of significant accounting policies

(Hereinafter referred to as the "financial statements").

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the Entity as at March 31, 2024 and its results of operations, its changes in net assets and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the "**Auditor's Responsibilities for the Audit of the Financial Statements**" section of our auditor's report.

We are independent of the Entity in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada and we have fulfilled our other ethical responsibilities in accordance with these requirements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

KPMG LLP, an Ontario limited liability partnership and member firm of the KPMG global organization of independent member firms affiliated with KPMG International Limited, a private English company limited by guarantee. KPMG Canada provides services to KPMG LLP.



Responsibilities of Management for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Entity's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Entity or to cease operations, or has no realistic alternative but to do so.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists.

Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit.

We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion.

The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Entity's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.



- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Entity's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Entity to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Chartered Professional Accountants, Licensed Public Accountants

Hamilton, Canada
July 18, 2024

NEXT GENERATION MANUFACTURING

Statement of Financial Position

March 31, 2024 with comparative information for 2023

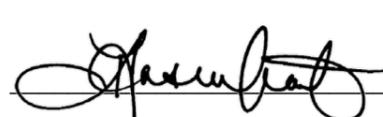
| (In thousands of dollars) | 2024 | 2023 |
|----------------------------|-----------|-----------|
| Assets | | |
| Current assets: | | |
| Cash | \$ 12,201 | \$ 23,866 |
| Accounts receivable | 6,695 | 55 |
| HST receivable | 712 | 250 |
| Project/program advances | 1,613 | 302 |
| Prepaid expenses | 1,753 | 529 |
| | 22,974 | 25,002 |
| Capital assets (note 3) | 34 | 29 |
| Intangible assets (note 4) | 1,028 | — |
| | \$ 24,036 | \$ 25,031 |

Liabilities and Net Assets

| | | |
|---|-----------|-----------|
| Current liabilities: | | |
| Accounts payable and accrued liabilities (note 6) | \$ 4,041 | \$ 1,303 |
| Project/program holdbacks | — | 4,383 |
| Unearned revenue | 470 | 184 |
| Deferred contributions (note 7) | 8,006 | 15,766 |
| | 12,517 | 21,636 |
| Deferred capital contributions (note 8) | 328 | — |
| | 12,845 | 21,636 |
| Net assets | 11,191 | 3,395 |
| Subsequent event (note 13) | | |
| | \$ 24,036 | \$ 25,031 |

See accompanying notes to financial statements.

On behalf of the Board:

 Director

 Director

NEXT GENERATION MANUFACTURING

Statements of Operations and Changes in Net Assets

Year ended March 31, 2024 with comparative information for 2023

| (In thousands of dollars) | 2024 | 2023 |
|---|-----------|-----------|
| Revenues: | | |
| Federal contributions | \$ 61,818 | \$ 83,179 |
| Administration fees | 5,299 | 309 |
| Training and other income | 2,820 | 224 |
| Industry in-kind contributions | 628 | 313 |
| Industry sponsorships | 382 | 20 |
| Interest income | 1,303 | 635 |
| | 72,250 | 84,680 |
| Expenses: | | |
| Project and program expenditures | 38,632 | 73,019 |
| Salaries and benefits | 8,407 | 6,781 |
| Advanced manufacturing ecosystem initiatives (note 9) | 3,993 | 692 |
| Outsourced services (note 10) | 11,463 | 3,871 |
| Administration and governance | 1,331 | 1,279 |
| Communications and events | 469 | 280 |
| Amortization of capital and intangible assets | 159 | 962 |
| | 64,454 | 86,884 |
| Excess (deficiency) of revenues over expenses | 7,796 | (2,204) |
| Net assets beginning of year | 3,395 | 5,599 |
| Net assets end of year | \$ 11,191 | \$ 3,395 |

See accompanying notes to financial statements.

NEXT GENERATION MANUFACTURING

Statement of Cash Flows

Year ended March 31, 2024 with comparative information for 2023

| (In thousands of dollars) | 2024 | 2023 |
|---|-----------|------------|
| Cash provided by (used in): | | |
| Operations: | | |
| Excess (deficiency) of revenues over expenses | \$ 7,796 | \$ (2,204) |
| Items not involving cash: | | |
| Amortization of capital and intangible assets | 159 | 962 |
| Intangible asset contributed in-kind | – | (497) |
| Deferred capital contributions from in-kind | – | 497 |
| Changes in non-cash operating working capital: | | |
| Decrease (increase) in accounts receivable | (6,640) | 408 |
| Increase in HST receivable | (462) | (413) |
| Decrease (increase) in project/program advances | (1,311) | 8,023 |
| Decrease in prepaid expenses | (1,224) | (81) |
| Increase (decrease) in accounts payable and accrued liabilities | 2,738 | (1,896) |
| Increase (decrease) in project/program holdbacks | (4,383) | 1,236 |
| Increase (decrease) in unearned revenue | 286 | (130) |
| Decrease in deferred contributions | (7,760) | (13,659) |
| | (10,801) | (7,754) |
| Investing: | | |
| Purchase of capital assets | (50) | (35) |
| Purchase of intangible assets | (1,142) | – |
| Deferred capital contributions | 328 | (773) |
| | (864) | (808) |
| Decrease in cash | (11,665) | (8,562) |
| Cash, beginning of year | 23,866 | 32,428 |
| Cash, end of year | \$ 12,201 | \$ 23,866 |

See accompanying notes to financial statements.

NEXT GENERATION MANUFACTURING CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2024

(in thousands of dollars)

1. Corporate information:

Next Generation Manufacturing Canada ("NGen") was incorporated under the laws of Canada as a not-for-profit corporation without share capital on November 23, 2017. NGen is an industry-led, organization dedicated to building next generation manufacturing capabilities nationally. Our mission is to help Canadian companies become global leaders in the application of leading technologies to manufacturing products and/or processes.

NGen projects and programs are aimed at driving greater technology development and technology adoption in Canadian manufacturing. To further support cluster growth, we also use data and systems to increase connections and collaboration across the Canadian advanced manufacturing network.

Contribution Agreements with the Federal Government by Department:

- a) Innovation, Science and Economic Development ("ISED"), represented by the Minister of Innovation, Science and Industry ("Minister")
 - I. To support building up next-generation manufacturing capabilities, and promoting collaboration in areas such as advanced robotics research and innovation by strengthening linkages between researchers in industry, academia, and research institutes in Canada and abroad, and providing financial support for the scaling and adoption of 4.0 technologies, effective November 9, 2018, ISED will provide a non-repayable contribution to NGen for 75% of eligible operating expenses that do not exceed 15% of the total contribution, and 100% of eligible project costs. The total is not to exceed the lesser of \$229,765 or 100% of total Industry Matching Funds obtained by the organization over the five-year period, ending March 31, 2024. NGen was approved for an additional \$20,000 on July 29, 2021 via an amendment to the Contribution Agreement to support projects in NGen's pipeline related to Automotive Zero-Emissions.
 - II. With effect March 23, 2023, ISED, has agreed to amend the original contribution agreement (in I.) to, among other things, increase the amount of the non-repayable contribution by a further \$145,708 of which \$19,930 is to be used towards eligible operating expenses and \$125,778 is to be used towards 100% of eligible project costs. The total is not to exceed the lesser of \$145,708 or 100% of total Industry Matching Funds obtained by the organization over the five-year period, ending March 31, 2028 (and referred to as "Phase 2").

The Minister may provide a further additional contribution of \$31,445 towards eligible project costs provided that NGen has met certain conditions to the Minister's satisfaction.
 - III. To support the commercialization of artificial intelligence as part of the broader investment in the Pan-Canadian Artificial Intelligence Strategy (PCAIS), effective September 13, 2023, ISED will provide a non-repayable contribution to NGen for 75% of eligible operating expenses that do not exceed 10% of the total contribution, and 100% of eligible project costs. The total is not to exceed the lesser of \$30,000 or 100% of total Industry Matching Funds obtained by the organization over the four-year period, ending March 31, 2026.

NEXT GENERATION MANUFACTURING CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2024
(in thousands of dollars)

1. Corporate information (continued):

- IV. To support building the groundwork for a National Quantum Strategy (NQS), effective June 23, 2023, ISED will provide a non-repayable contribution to NGen for 75% of eligible operating expenses that do not exceed 15% of the total contribution, and 100% of eligible project costs. The total is not to exceed the lesser of \$7,000 or 100% of total Industry Matching Funds obtained by the organization over the five-year period, ending March 31, 2028.

The amount of ISED contributions under these agreements varies from year to year based on forecasted operating and project spend and amounts may be reallocated to other fiscal years within the program term with the written approval from the Minister of ISED.

- b) Employment and Social Development Canada (“ESDC”), represented by the Minister of Employment, Workforce Development and Disability Inclusion (“Minister”)

To support companies in onboarding new and diverse workers to Canadian manufacturing and in upskilling the existing workforce by developing and validating tools for skills assessment and development and providing hiring and training supports, effective November 21, 2023, ESDC will provide a non-repayable contribution in the amount of \$15,854 towards eligible expenditures over the two-year period, ended March 31, 2024. The non-repayable contribution was increased to \$19,763 via an amendment dated October 10, 2023

- c) Canada Space Agency (“CSA”), represented by the Director General, Space Exploration of The Canada Space Agency (“Director”)

To support the development of novel In-Situ Resource Utilization (“ISRU”) solutions for mining and processing critical minerals in the lunar environment, effective November 3, 2023, CSA will provide a non-repayable contribution in the amount of \$1,500 towards eligible expenditures over the two-year period, ending March 31, 2025.

Payment by the Federal Government of the contributions in a), b) and c) is conditional on there being a legislated appropriation for the fiscal year in which the contributions are due. The Minister’s and Director shall have the right to terminate or reduce the contribution in the event that the amount of the appropriation is reduced or denied by Parliament.

NEXT GENERATION MANUFACTURING CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2024
(in thousands of dollars)

2. Significant accounting policies:

These financial statements are prepared in accordance with Canadian accounting standards for not-for-profit organizations. NGen’s significant accounting policies are as follows:

- (a) Revenue recognition:

NGen receives grant revenue from ISED under the Innovation Superclusters Initiative (“ISI”), grant revenue from ESDC, grant revenue from CSA and administration fees, sponsorships and other revenue from industry.

NGen follows the deferral method of accounting for contributions. Unrestricted contributions and sponsorships are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured.

Externally restricted contributions are recognized as revenue in the year in which the related expenses are incurred.

Deferred capital contributions related to capital and intangible assets represent amounts received specifically for the purpose of purchasing capital and intangible assets. Externally restricted contributions related to the purchase of capital and intangible assets are deferred and amortized to revenue on the same basis as the related capital or intangible asset.

An administration fee of 3 – 5% of total eligible project costs is charged to recipients prior to contracting. Revenue related to this non-refundable fee is recognized when invoiced.

- (b) Cash:

Cash consists of amounts held in bank accounts which earn interest on a monthly basis.

- (c) Project/program advances:

Project/program advances consist of funding provided to projects in advance of project costs being incurred. Advances are drawn down and recognized as revenue when a claim for project costs incurred is submitted and approved by NGen.

- (d) Capital assets:

Purchased capital assets are recorded at cost.

Capital assets are amortized on a straight-line basis using the following annual rates:

| Asset | Rate |
|------------------------|------|
| Computers | 55% |
| Furniture and fixtures | 20% |

NEXT GENERATION MANUFACTURING CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2024
(in thousands of dollars)

2. Significant accounting policies (continued):

(e) Intangible assets:

Intangible assets are measured at cost less accumulated amortization. Amortization is provided for, upon the commencement of the utilization of the asset, on a straight-line basis over the remaining term of the respective contribution agreement.

Development activities are recognized as an asset provided they meet the capitalization criteria, which include NGen's ability to demonstrate: technical feasibility of completing the intangible asset so that it will be available for use; NGen's intention to complete the asset for use; NGen's ability to use the asset; the adequacy of NGen's resources to complete the development and to use the asset; NGen's ability to measure reliably the expenditures during the development; and NGen's ability to demonstrate that the asset will generate future economic benefits.

(f) Project/program holdbacks:

Project/program holdbacks represent unpaid amounts for reconciled project costs which become payable to projects upon project closeout. NGen will hold back up to 15% of total available project funding until the closure of a project to ensure the receipt and acceptance of all project deliverables from the project. Holdbacks are recorded when a claim for project costs incurred is submitted and approved by NGen and reconciled funding exceeds 85% of total available funding.

(g) Contributed services:

The value of in-kind services for professional fees, materials and administrative services is recognized in the financial statements at the fair value of such services at their date of contribution.

(h) Income taxes:

NGen is a not-for-profit organization under the Income Tax Act (Canada) and accordingly is exempt from income taxes.

NEXT GENERATION MANUFACTURING CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2024
(in thousands of dollars)

2. Significant accounting policies (continued):

(i) Financial instruments:

Financial instruments are recorded at fair value on initial recognition. Freestanding derivative instruments that are not in a qualifying hedging relationship and equity instruments that are quoted in an active market are subsequently measured at fair value. All other financial instruments are subsequently recorded at cost or amortized cost, unless management has elected to carry the instruments at fair value. NGen has not elected to carry any such financial instruments at fair value.

Transaction costs incurred on the acquisition of financial instruments measured subsequently at fair value are expensed as incurred. All other financial instruments are adjusted by transaction costs incurred on acquisition and financing costs, which are amortized using the straight-line method.

Financial assets are assessed for impairment on an annual basis at the end of the fiscal year if there are indicators of impairment. If there is an indicator of impairment, NGen determines if there is a significant adverse change in the expected amount or timing of future cash flows from the financial asset. If there is a significant adverse change in the expected cash flows, the carrying value of the financial asset is reduced to the highest of the present value of the expected cash flows, the amount that could be realized from selling the financial asset or the amount NGen expects to realize by exercising its right to any collateral. If events and circumstances reverse in a future year, an impairment loss will be reversed to the extent of the improvement, not exceeding the initial impairment charge.

(j) Use of estimates:

The preparation of the financial statements in conformity with Canadian accounting standards for not-for-profit organizations requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the year. Actual results could differ from those estimates.

3. Capital assets:

| | 2024 | | 2023 | |
|------------------------|---------------|--------------------------|----------------|----------------|
| | Cost | Accumulated amortization | Net book value | Net book value |
| Computers | \$ 186 | \$ 152 | \$ 34 | \$ 25 |
| Furniture and fixtures | 24 | 24 | – | 4 |
| | <u>\$ 210</u> | <u>\$ 176</u> | <u>\$ 34</u> | <u>\$ 29</u> |

Cost and accumulated amortization at March 31, 2023 amounted to \$159 and \$130 respectively.

NEXT GENERATION MANUFACTURING CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2024
(in thousands of dollars)

4. Intangible assets:

| | Cost | Accumulated amortization | 2024 Net book value | 2023 Net book value |
|-----------------------------|-----------------|--------------------------|------------------------|------------------------|
| Financial Claims Portal | \$ 200 | \$ 40 | \$ 160 | \$ – |
| NGen Connects Platform | 574 | – | 574 | – |
| Salesforce Grant Management | 368 | 74 | 294 | – |
| | <u>\$ 1,142</u> | <u>\$ 114</u> | <u>\$ 1,028</u> | <u>\$ –</u> |

Cost and accumulated amortization at March 31, 2023 amounted to \$2,044 and \$2,044 respectively.

i. Financial Claims Portal

Pursuant to an Asset Purchase Agreement with Hockeystick.co Inc. dated April 1, 2023, NGen purchased the intellectual property assets related to the financial claims portal at a cost of \$200, which will be amortized over a period of 5-years. Project participants use this portal to submit claims and supporting documentation for processing and reimbursement.

ii. NGen Connects Platform

The NGen Connects Platform allows Members to search and identify basic capabilities across Canada's advanced manufacturing ecosystem – potential innovation partners, suppliers, customers and members. The Platform was available for use on April 1, 2024 and will be amortized over a period of 4 years.

iii. Salesforce Grant Management

The asset reflects the implementation and customization of the Salesforce module to allow project application intake and is utilized to manage the internal workflow from the application stage through to the contracting stage. The module was available for use on April 1, 2023 and will be amortized over a period of 5 years.

NEXT GENERATION MANUFACTURING CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2024
(in thousands of dollars)

5. Bank overdraft:

NGen has an authorized operating line of credit of \$1,000, repayable on demand. The interest rate charged on the operating line is prime plus 1.00%, payable monthly in arrears. At year-end, the balance drawn on the operating line was \$nil (2023 - \$nil). In addition, NGen has credit facilities in the form of corporate credit cards which total \$250 (2023 - \$150) of which \$111 (2023 - \$79) was utilized and included in accounts payable and accrued liabilities.

6. Accounts payable and accrued liabilities:

Included in accounts payable and accrued liabilities are trade amounts due, project and program reimbursements payable and performance-based incentive accruals.

7. Deferred contributions:

Deferred contributions represent unspent externally restricted government funds from the ISED, ESDC and CSA programs, for the purpose of providing funding for eligible costs and for the payment of NGen's subsequent years' operations. The change in the deferred contributions balance is as follows:

| | 2024 | 2023 |
|-------------------------------|-----------------|------------------|
| Balance, beginning of year | \$ 15,766 | \$ 29,425 |
| Funding received | 55,485 | 68,994 |
| Amounts recognized as revenue | (63,245) | (82,653) |
| <u>Balance, end of year</u> | <u>\$ 8,006</u> | <u>\$ 15,766</u> |

Total revenues include amortization of deferred capital contributions of \$82 (2023 - \$nil) referenced in Note 8.

NEXT GENERATION MANUFACTURING CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2024
(in thousands of dollars)

8. Deferred capital contributions:

Deferred capital contributions represent the unamortized amount of restricted government funds from the ISED program received for the purchase of intangible assets and in-kind contributions from the platform service provider. Details of the change in the unamortized deferred capital contribution balance is as follows:

| | 2024 | | 2023 | |
|--|------|------|------|-------|
| Balance, beginning of year | \$ | – | \$ | 773 |
| Addition of the Financial Claims Portal | | 150 | | – |
| Addition of Salesforce Grant Management System | | 260 | | – |
| Amount recognized as revenue | | (82) | | (526) |
| Amount recognized as in-kind revenue | | – | | (247) |
| Balance, end of year | \$ | 328 | \$ | – |

9. Advanced manufacturing ecosystem initiatives:

Advanced manufacturing ecosystem initiatives represent payments to external parties who will carry out activities with and on behalf of NGen to help build out and strengthen Canada's advanced manufacturing ecosystem. These activities will:

- Develop strategic opportunity roadmaps for advanced manufacturing in Canada based on industry and technology trend analysis and innovation needs assessments of larger companies leading Canadian supply chains.
- Expand and deepen connections among advanced manufacturing clusters that are part of NGen's cross-Canada cluster network, providing education and tools that will help them and their members.
- Support transformation management on the part of SMEs looking to develop, protect, and commercialize IP, adopt advanced manufacturing technologies, or develop their technology solutions for business growth.
- Help build a more equitable, diverse, inclusive, and highly-skilled advanced manufacturing workforce by further developing NGen's [CareersoftheFuture.ca](https://careersofthefuture.ca) initiative aimed at attracting young people from diverse backgrounds into careers in advanced manufacturing.
- Enhance NGen's existing workforce development programs by expanding our open-source online education program
- Expand our Indigenous advanced manufacturing education and skills development programs.
- Promote Canada's advanced manufacturing ecosystem and company capabilities on a global stage, including expanded participation in key trade events like Hannover Messe.

NEXT GENERATION MANUFACTURING CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2024
(in thousands of dollars)

10. Outsourced services:

Outsourced services include payments for information technology services, independent expert assessors for project reviews, contractor payments for the monitoring of projects and service provider costs related to the onboarding and upskilling of the Canadian workforce under the ESDC program.

11. Committed funding:

NGen invests in projects and programs which drive greater technology development and technology adoption in Canadian manufacturing. Projects are selected through a competitive process and successful proponents enter into Master Project Agreements outlining the terms of the investment. As of March 31, 2024, commitments for funding by stream are as follows:

| | Total committed funding | Estimated remaining commitment | Total estimated funding |
|-----------------|-------------------------------|--------------------------------------|-------------------------------|
| Phase2 Projects | \$ 53,279 | \$ 76,767 | \$ 130,046 |
| PCAIS projects | 19,067 | 8,683 | 27,750 |
| NQS | 5,603 | 609 | 6,212 |
| CSA | 1,272 | 78 | 1,350 |
| | \$ 79,221 | \$ 86,137 | \$ 165,358 |

12. Financial risks and concentration of risk:

NGen has a risk management framework to monitor, evaluate and manage the principal risks assumed with its financial instruments. The following analysis provides a summary of NGen's exposure to and concentrations of risk at March 31, 2024:

(a) Liquidity risk:

Liquidity risk is the risk that NGen will be unable to fulfill its obligations on a timely basis or at a reasonable cost. NGen manages its liquidity risk by monitoring its operating requirements and prepares budget and cash forecasts to ensure it has sufficient funds to fulfill its obligations. As described in Note 5, the organization also has access to an operating line of credit. There has been no change to the risk exposures from 2023.

(b) Interest rate risk:

Interest rate risk arises from fluctuations in interest rates depending on prevailing rates. NGen has exposure to interest rate risk through its operating line of credit, however, management has assessed that the impact on NGen's financial position would be insignificant.

(c) Projects and Programs risk:

Projects and Programs risk is the risk where companies that have contracted with NGen may not be able to continue to fund their portion of the costs. If requested by companies, NGen will provide advances to cover eligible project and program expenditures to assist companies with cash flow.

NEXT GENERATION MANUFACTURING CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2024
(in thousands of dollars)

13. Subsequent event:

NGen received conditional approval from ISED on July 3, 2024 relating to Budget 2024, which announced a new \$50 million Homebuilding and Technology Innovation Fund over two years starting in 2024-25.

NGen is to lead this fund that will promote the development, commercialization, and adoption of productivity enhancing technologies, automation, and sustainable materials for Canada's Homebuilding industry.

14. Change in classification:

Certain comparative information has been reclassified to confirm the financial statements presentation adopted in the current year.

The logo for NGen, featuring the letters 'NGen' in a bold, orange, sans-serif font. The letter 'G' is stylized with a gear-like pattern inside its upper curve.